



APPLECOLOR MONITOR 100

TECHNICAL PROCEDURES

Table of Contents

Section 1. General

General Information.....	1.2
Setting Up the Monitor.....	1.5
Safety Precautions.....	1.7
Disposing of the Cathode-Ray Tube (CRT).....	1.8

Section 2. Take-apart

Removing the Rear Enclosure.....	2.3
Replacing the Rear Enclosure.....	2.3
Discharging the CRT.....	2.5
Removing and Replacing Procedures:	
Logic Board.....	2.7
Power Supply (P/S) Board.....	2.13
Power Transformer.....	2.14
Tilt Motor.....	2.17
Front Bezel.....	2.19
CRT/Yoke Assembly.....	2.21
Mask.....	2.25
Brightness/Contrast Control Knobs.....	2.27
Brightness/Contrast Control.....	2.27
Green Only Switch.....	2.29
Power Button/Switch...(LED).....	2.31
Tilt Motor Button/Switch.....	2.33
Replace the Power Supply Fuse (F601).....	2.35
Control Panel Door.....(See Section 5, "Illustrated Parts")	
Tilt Loading Spring.....(See Section 5 "Illustrated Parts")	

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Section 3. Adjustments

Logic Board Adjustments.....	3.3
Introduction.....	3.3
Materials Needed.....	3.3
Set Up Procedure.....	3.5
Evaluating the Video Test.....	3.7
Vertical Adjustments.....	3.9
Horizontal Adjustments.....	3.9
Focus Adjustment.....	3.9
Color Adjustments.....	3.11
Color Bar Check.....	3.11
White Balance.....	3.11

Section 4. Troubleshooting Guide

Introduction.....	4.2
Symptoms:	
No raster.....	4.2
One horizontal line appears.....	4.2
One vertical line appears.....	4.2
Raster deformed abnormally.....	4.2
Abnormal raster with winding or excessive picture fluctuation.....	4.3
Spot remains with monitor off.....	4.3
Brightness range abnormal or picture is flashing.....	4.3
Raster size small picture abnormally bright.....	4.3
No vertical synchronization.....	4.3
Raster not centered.....	4.3
No picture no contrast.....	4.3
Picture/characters inclined.....	4.3
Picture characters shiver.....	4.4
15 or more seconds for picture to appear.....	4.4
Picture appears/disappears.....	4.4
Horizontal linearity bad.....	4.4
Vertical linearity bad.....	4.4
Won't focus.....	4.4
Colors not right.....	4.4

Section 5. Illustrated Parts List



AppleColor Monitor 100 Technical Procedures

Section 1

General

General Information.....	1.2
Setting Up the Monitor.....	1.5
Safety Precautions.....	1.7
Disposing of the Cathode-Ray Tube (CRT).....	1.8



General Information

The AppleColor Monitor 100 is an accessory product to be used with the Apple®][and /// Personal Computer families. Its state-of-the-art design incorporates the following features:

1. 12" tilting screen.
2. High quality 80-column display.
3. A "GREEN ONLY" switch for systems that output white text.
4. Nonglare, high contrast screen surface.
5. Accurate reproduction of color graphics.

[There are two versions of the AppleColor Monitor 100 -- Rev. 0 and Rev. A. There are very slight differences between the two versions. Technical procedures are the same for both, except where noted in this manual revision (Feb. 85).]

Frequently used controls are located behind a protective door on the front of the monitor, to the right-hand side as you face it; while those controls less frequently used are on the back. Internationally recognized symbols, shown in Figure 1, are used to identify the various controls.

FIGURE 1

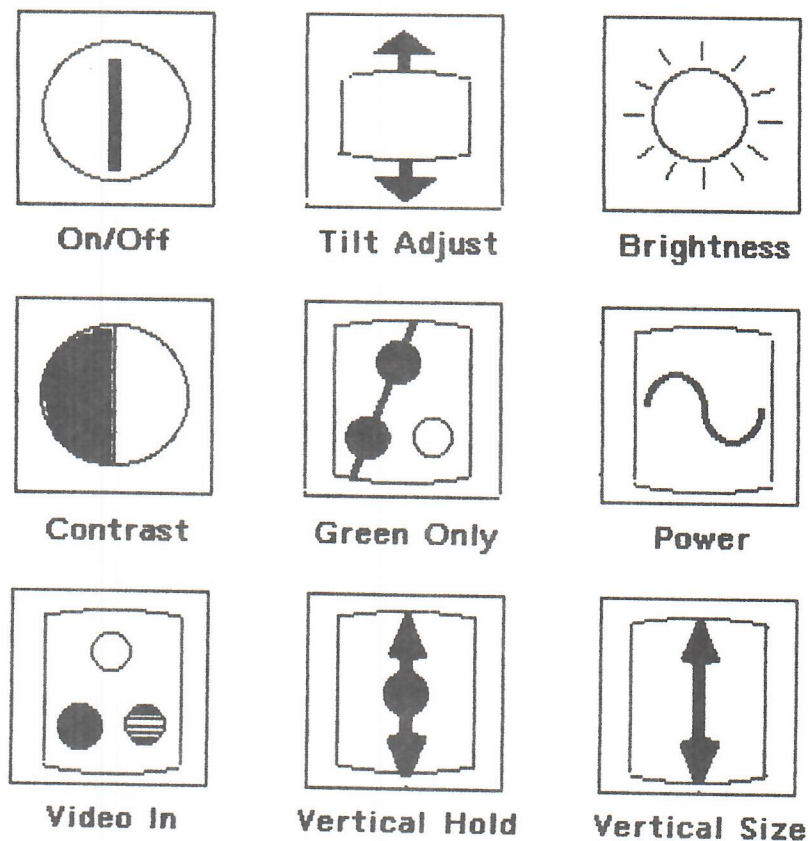




FIGURE 1

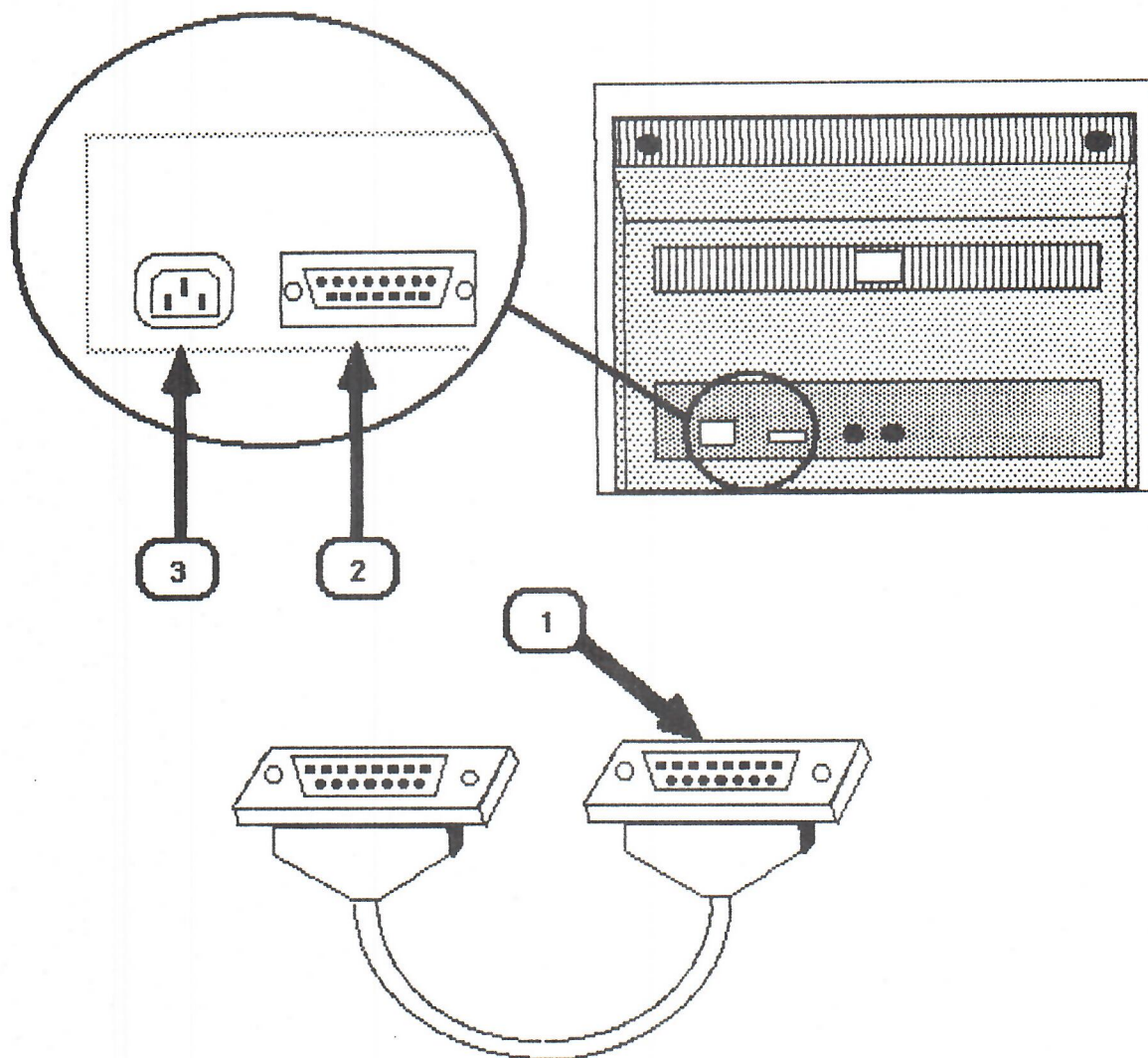


FIGURE 2



Setting Up the Monitor

WARNING: BE SURE THAT THE COMPUTER IS TURNED OFF BEFORE PLUGGING ANY CABLES INTO IT.

1. Turn the monitor so that the back is facing you.
2. Plug either end of the video cable (Figure 2, #1) firmly into the video connector (Figure 2, #2) on the back of the monitor.
3. Fasten the holding screws located at both sides of the connector.
4. Plug the other end of the video cable into the RGB video output connector of your computer.

The location of the video output connector will depend on which computer you are using. Refer to the Owner's Guide for your system.

5. Connect the AC power cord to the power cord connector (Figure 2, #3) and to the wall outlet.

CAUTION: THIS EQUIPMENT IS INTENDED TO BE ELECTRICALLY GROUNDED. This product is equipped with a three-wire grounding type plug (a plug having a third pin). This plug will fit only into a grounding type AC outlet. THIS IS A SAFETY FEATURE.

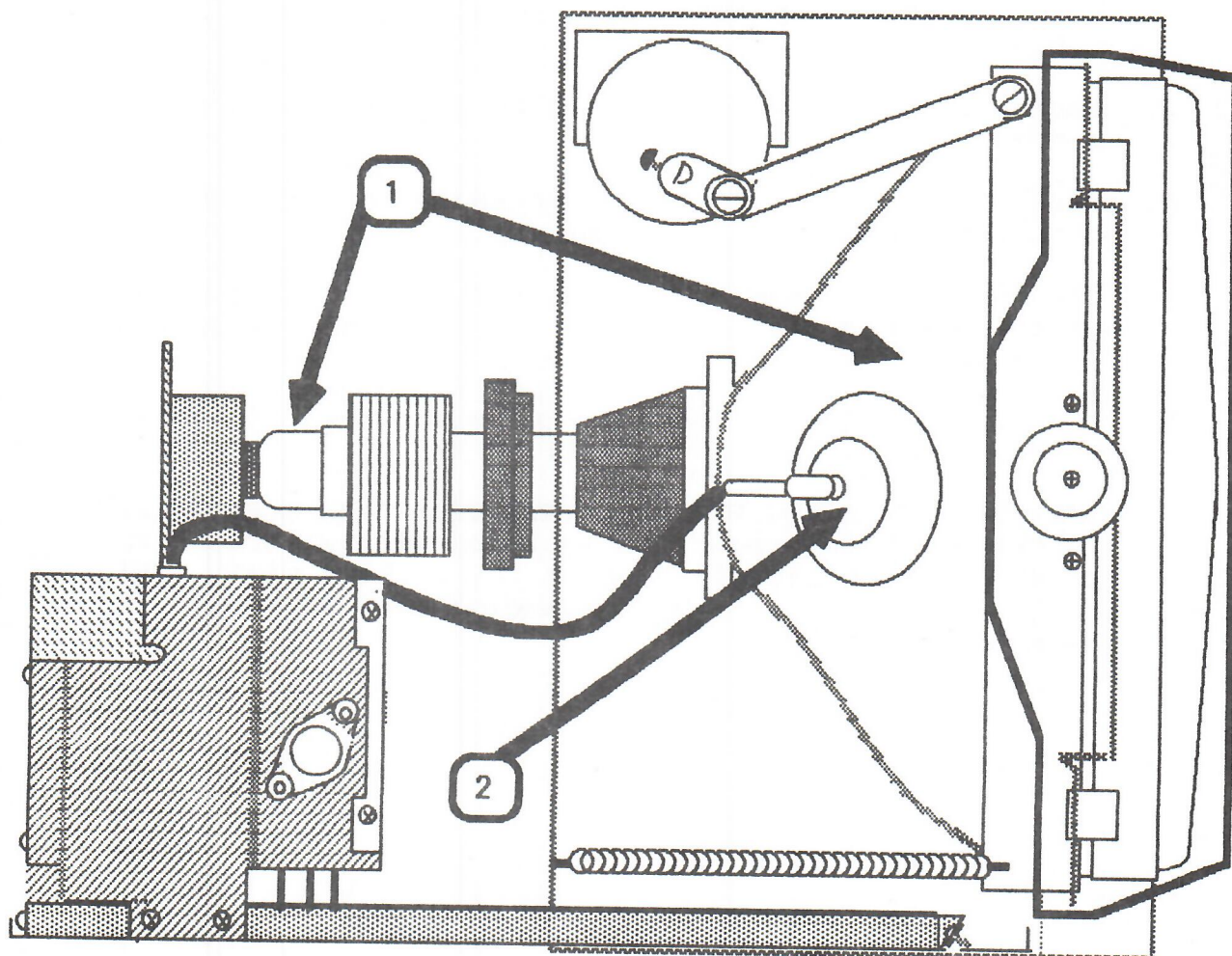


FIGURE 3



Safety Precautions

Review and memorize the safety rules listed below before working on the monitor.

1. **ALWAYS REMOVE THE AC POWER CORD BEFORE WORKING INSIDE THE APPLECOLOR MONITOR 100.**
2. **ALWAYS DISCHARGE THE CATHODE-RAY TUBE (CRT) (Figure 3, 1) BEFORE REMOVING OR REPLACING ANY INTERNAL PARTS.** The Cathode-Ray Tube in the AppleColor Monitor 100 is an extremely dangerous piece of equipment. It runs at 23,000 volts DC and contains a high vacuum. Before touching any internal components you must discharge the CRT.

NOTE: See Section 2 for CRT discharging procedures.

3. **ALWAYS WEAR SAFETY GOGGLES WHEN WORKING WITH A CRT.** Aside from electric shock, the most serious danger in working with CRTs is that you may break the tube and cause it to implode. Since the tube contains a high vacuum, a serious break can cause the tube to collapse into itself violently, then explode. This will not always happen when the tube is broken, but it is always possible, and you must be prepared for the worst case.
4. **NEVER SUBJECT THE TUBE TO MORE THAN MODERATE PRESSURE, AND NEVER HANDLE A TUBE BY ITS NECK.** To prevent an implosion, you should take every precaution against breaking the tube, especially at the neck, where the tube is the thinnest.
5. **ALWAYS REMOVE ALL RINGS, WRISTWATCHES, BRACELETS, ETC., BEFORE WORKING INSIDE THE MONITOR.** Metal jewelry is an excellent conductor of electricity. Removing jewelry will reduce the possibility of electric shock.
6. **NEVER TOUCH THE ANODE** Normally the anode has a connector (Figure 3, #2) plugged into it, but when a CRT is replaced, this connector is removed, exposing the anode. The anode can maintain a charge of several thousand volts (even after the power is off).
7. **KEEP ONE HAND IN YOUR POCKET OR BEHIND YOUR BACK WHEN ADJUSTING OR DISCHARGING A LIVE CRT.** This reduces the risk of lethal injury should you accidentally contact high voltage.

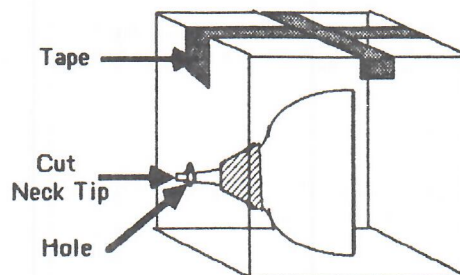


Disposing of the Cathode-Ray Tube (CRT)

Since the CRT contains a high vacuum, a break can cause the tube to collapse into itself violently, and then explode. So, before you dispose of a defunct CRT, it must be devacuumed. The procedures for devacuuming the AppleColor Monitor 100 CRT are as follows:

1. Put on a pair of safety goggles.
2. Pull off the black plastic guide located at the end of the CRT neck.
3. Use a pair of sharp diagonal cutters to carefully clip off the connector pins from which the plastic guide was removed.
4. Locate a thick cardboard box large enough to completely conceal the CRT.
5. Cut or drill a hole in the side of the box, just large enough to insert the very tip of the CRT neck through. The hole should be about six inches from the bottom.
6. Carefully place the CRT inside the box with the tip of the neck protruding through the hole and tape the box flaps down with a strong tape, preferably duct tape. (Diagram below.)

WARNING: ONLY THE VERY TIP OF THE CRT NECK SHOULD BE PROTRUDING THROUGH THE HOLE IN THE BOX. THE BOX MUST NOT HAVE ANY OTHER OPENINGS!



7. Standing to one side, use a pair of diagonal cutters to snip off the very tip of the CRT neck protruding through the hole.

WARNING: DO NOT LOOK DIRECTLY AT THE BOX WHEN SNIPPING OFF THE NECK TIP!

You will hear a prolonged sound of air entering the tube (psssssssss...). The CRT is now devacuumed.



AppleColor Monitor 100 Technical Procedures

Section 2

Take-Apart

Removing the Rear Enclosure.....	2.3
Replacing the Rear Enclosure.....	2.3
Discharging the CRT.....	2.5
Removing and Replacing Procedures:	
Logic Board.....	2.7
Power Supply (P/S) Board.....	2.13
Power Transformer.....	2.14
Tilt Motor.....	2.17
Front Bezel.....	2.19
CRT/Yoke Assembly.....	2.21
Mask.....	2.25
Brightness/Contrast Control Knobs.....	2.27
Brightness/Contrast Control.....	2.27
Green Only Switch.....	2.29
Power Button/Switch...(LED).....	2.31
Tilt Motor Button/Switch.....	2.33
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Tilt Loading Spring.....(See Section 5 "Illustrated Parts")	

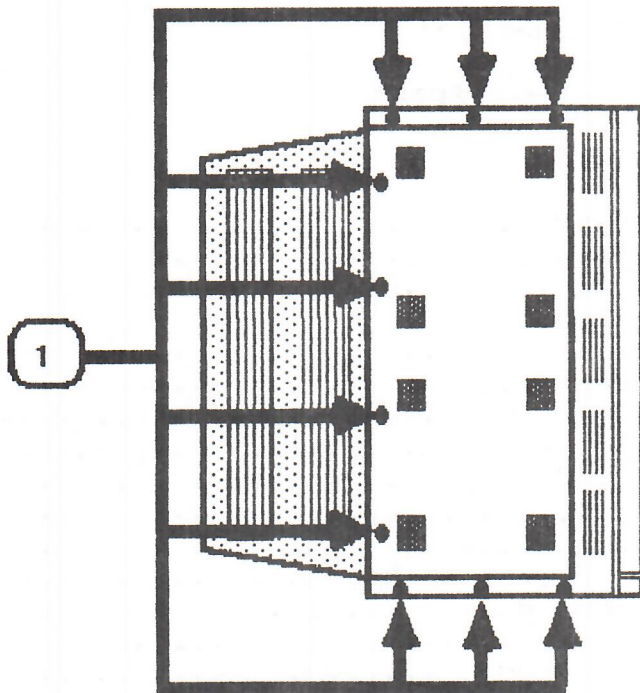


FIGURE 1

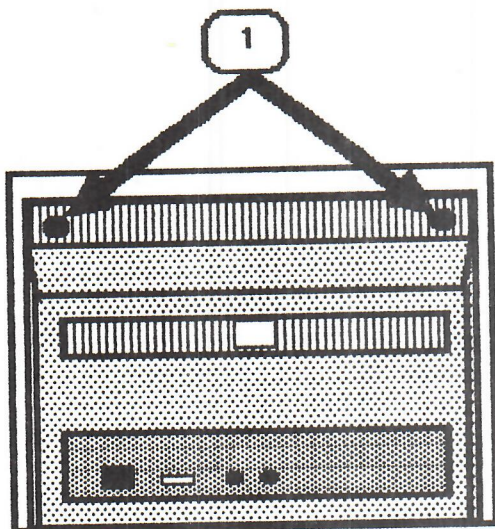


FIGURE 2

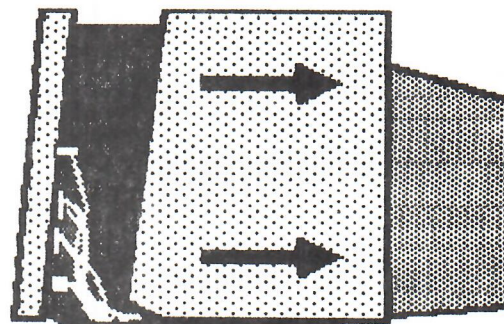


FIGURE 3

Removing the Rear Enclosure

1. Turn the monitor on and use the tilt switch to rotate the screen until it is facing as far down as possible. This will position the CRT neck away from the logic board for easy access to the logic board.
2. Turn the monitor off. Disconnect the AC power cord and the video cable from the back of the monitor.
3. Place the monitor on its right side and turn it so that the bottom is facing you.
4. Remove the ten screws shown in Figure 1, #1.
5. Carefully set the monitor back on its feet with the back facing you, as shown in Figure 2.
6. Remove the two screws shown in Figure 2, #1.
7. Slide the case straight back and away from the monitor (Figure 3). Set it aside.

Replacing the Rear Enclosure

1. Turn the monitor so that the back is facing you.
2. Carefully slide the case forward onto the monitor chassis.
3. Tighten the two screws shown in Figure 2, #1.
4. Carefully set the monitor on its side with the bottom facing you and replace the ten screws shown in Figure 1, #1.
5. Set the monitor upright.

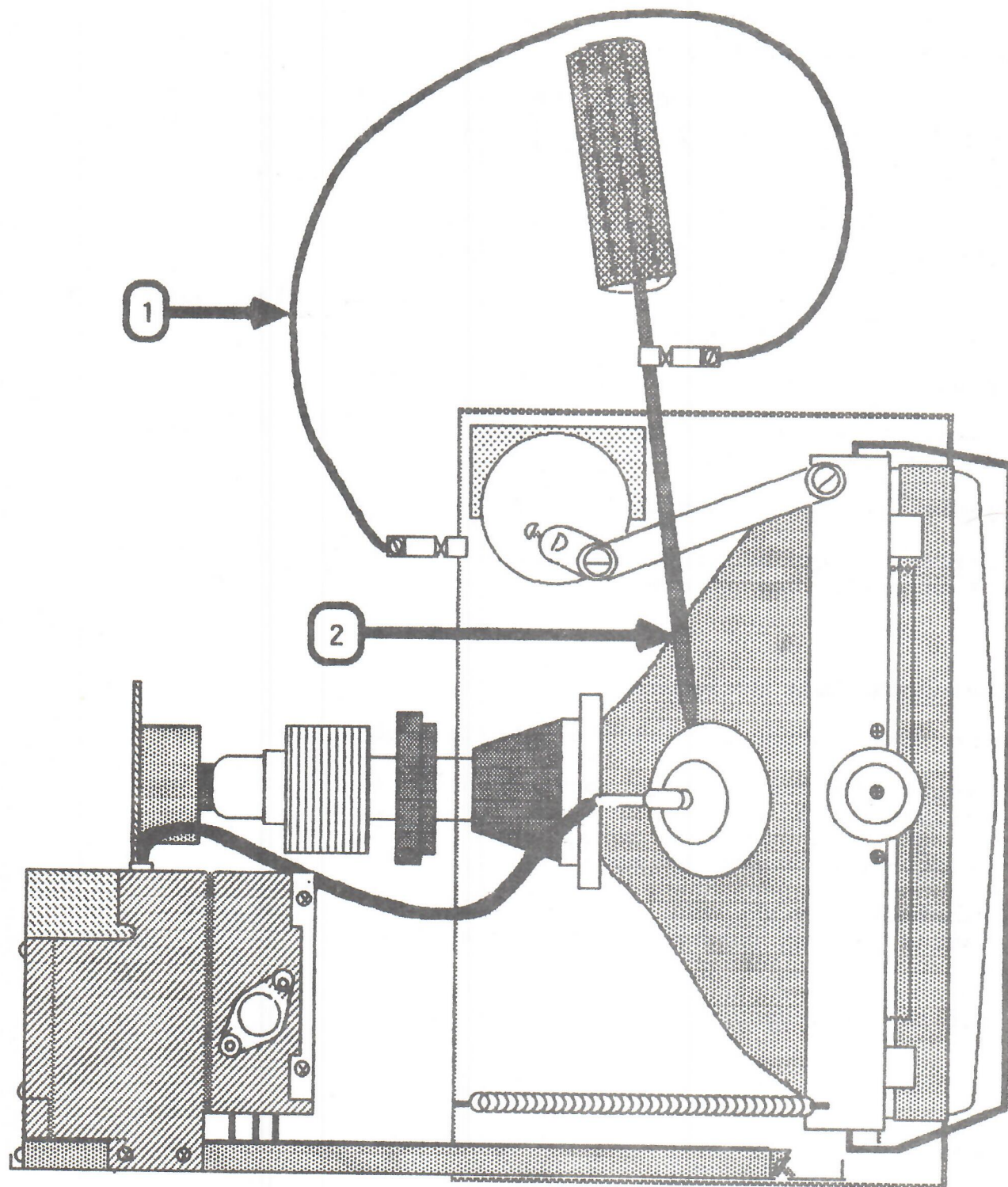


FIGURE 4



Discharging the CRT

1. Turn off the monitor.
2. Disconnect the AC power cord.
3. Remove the rear enclosure.
4. Position the monitor so that the back is facing you.
5. Remove any rings, wristwatches, and bracelets.
6. Put on safety goggles.
7. Attach one end of an alligator lead to a long flatblade screwdriver, two inches from the insulated handle. Attach the other end to any part of the metal chassis surrounding the CRT. (Figure 4, #1).

WARNING: USE ONLY ONE HAND WHILE DISCHARGING THE CRT. This is to eliminate any chance of your becoming a path for current should your hand slip and touch the metal part of the screwdriver. Grasp only the insulated handle of the screwdriver while discharging the CRT.

8. Slide the screwdriver under the CRT anode cap (Figure 4, #2) and push it towards the center of the cap until the blade comes into contact with the metal anode ring.

CAUTION: DO NOT USE FORCE. If it is difficult to get the screwdriver under the anode cap, use a smaller screwdriver to loosen the suction of the anode cap on the tube. Then proceed to discharge the anode with the larger screwdriver.

9. Remove the screwdriver.
10. Remove the alligator clips.
11. Peel back the anode cap until you can see the anode ring at the center. Look at the metal connector in the center of the cap and notice how it is clipped into the CRT. Push on the cap in one direction and lift the cap off of the tube.

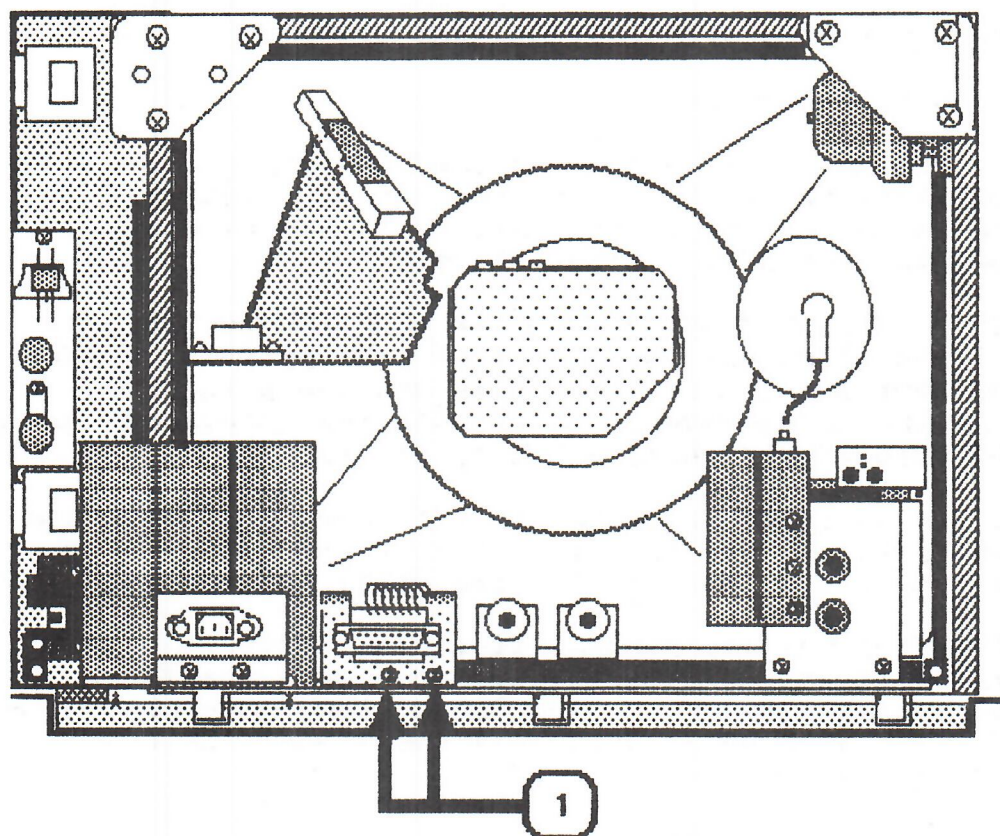


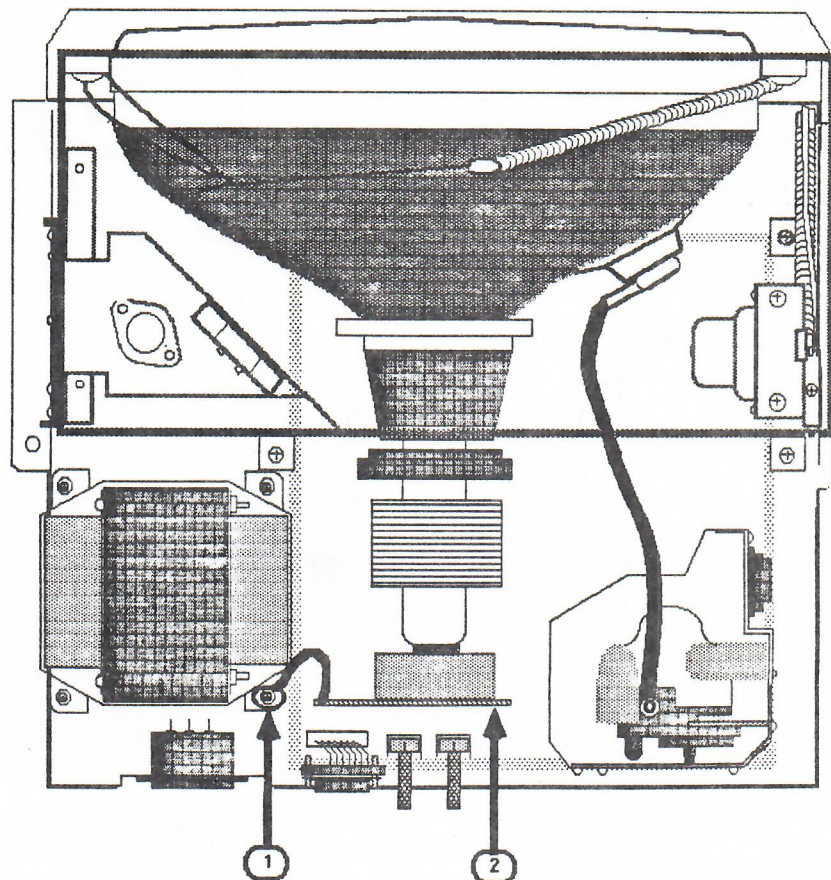
FIGURE 5

Removing the Logic Board

NOTE: The CRT socket board, flyback transformer, and main logic board are all considered parts of one module since they cannot be separated from each other without desoldering components.

1. Disconnect the AC power cord.
2. Remove the rear enclosure.
3. Follow Steps 4 through 8 of "Discharging the CRT."
4. Remove the two Phillips screws (Figure 5, #1) which secure the DB-15 connector to the chassis. Disconnect the other end of the DB-15 cable from the logic board.
5. Disconnect the ground strap by removing the power transformer screw shown in Figure 6, #1.
6. Carefully pull the CRT socket board (Figure 6, #2) away from the CRT neck until it barely clears the neck base. Hold the board so that it does not fall free, and tilt it so that the component side is facing up.

FIGURE 6



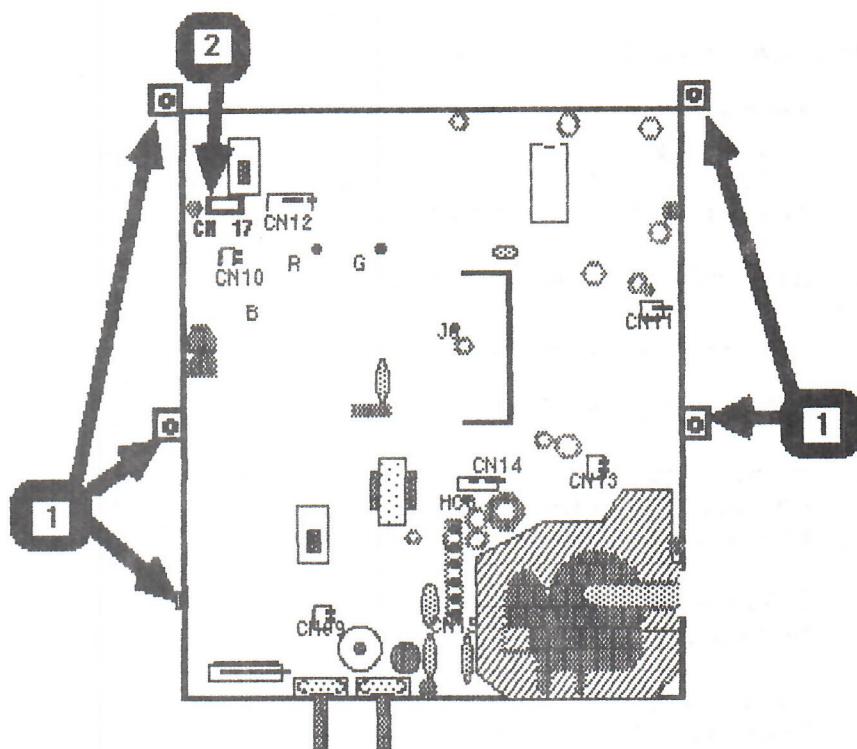


FIGURE 8

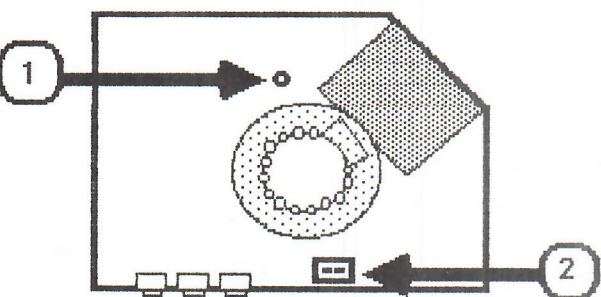


FIGURE 7

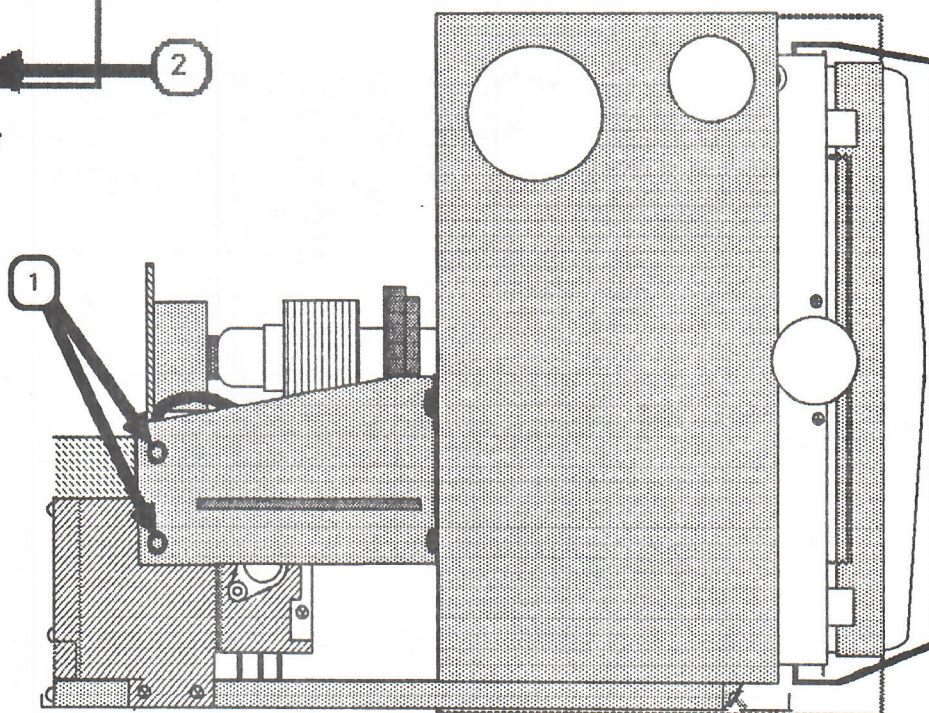


FIGURE 8A



NOTE: For those connectors with tabs, push in on the tabs before pulling the connector off. If connector 15 (CN 15 / logic brd) is difficult to remove, use a small, flatblade screwdriver to pry at both sides of the connector to loosen it before pulling it off.

CAUTION: DO NOT PULL ON THE WIRES ATTACHED TO THE CONNECTORS WHEN REMOVING THEM.

6. Disconnect the following connectors from the CRT socket board: (Figure 7.)

- a) CN16 (black) -- Figure 7, #1

- b) CN17 (blue and white) -- Figure 7, #2 (AppleColor Monitor 100 Rev. 0 only)

NOTE: On the AppleColor Monitor 100 Rev. A, CN17 is located on the logic board (Figure 8, #2) instead of on the CRT socket board.

7. Remove the five Phillips mounting screws (Figure 8, #1) from the metal plate which supports the logic board. For CRT Rev. A, also remove the two Phillips screws (Figure 8A, #1) securing the support bracket to the side of the flyback transformer.
8. Very carefully slide the logic board about halfway out of the chassis.

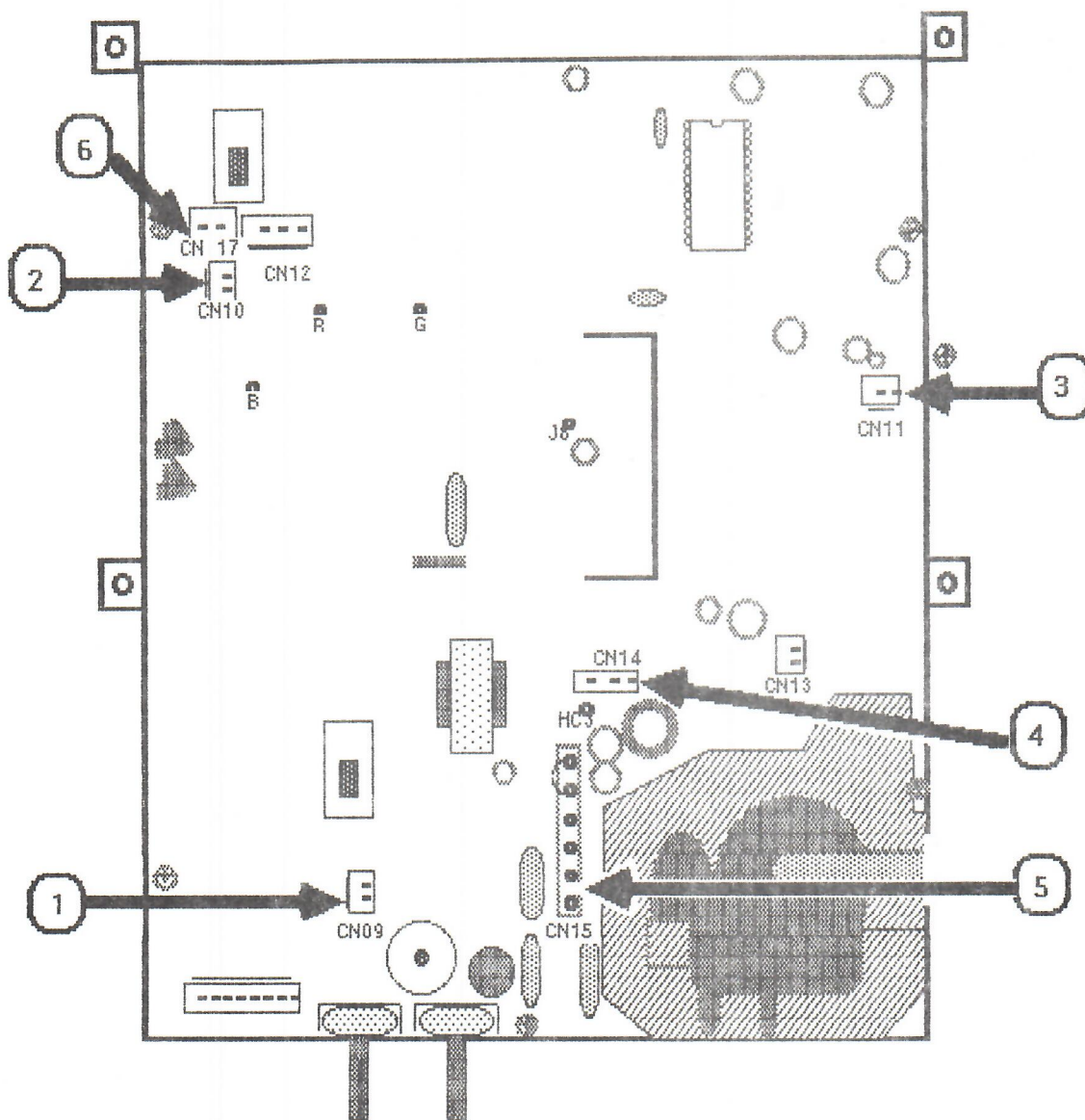


FIGURE 9

9. Disconnect the following connectors from the logic board:
 - a) CN09 (pink and green) -- Figure 9, #1
 - b) CN10 (blue and black) -- Figure 9, #2
 - c) CN11 (red and yellow) -- Figure 9, #3
 - d) CN14 (red and black) -- Figure 9, #4
 - e) CN15 (red, blue, green, and yellow) -- Figure 9, #5
 - f) CN17 (blue and white) -- Figure 8, #6 (Rev. A only -- see explanation given in Step 6).
10. Cut any plastic cable ties that hold wires together.
11. Carefully slide the logic board and the CRT socket board all the way out of the monitor chassis.

Replacing the Logic Board

1. Orient the logic board as it is shown in Figure 9.
2. Slide the logic board halfway back into the chassis.
3. Connect to the logic board the connectors listed in step 9 of "Removing the Logic Board".

CAUTION: Be sure that all the connector wires are placed under the CRT neck!
4. Replace the CRT socket board. It fits only one way.
5. Position the ground strap over the power transformer screw hole from which it was removed and tighten the screw to secure it. (Figure 6, #1.)
6. Replace the five Phillips mounting screws to secure the logic board to the chassis. For the Rev. A monitor, also replace the two Phillips screws which secure the flyback transformer unit bracket to the side of the chassis.
7. Connect to the CRT socket board the connectors listed in step 6 of "Removing the Logic Board".

CAUTION: Be sure the anode lead is not touching any other components or wires. This is to protect other components should the anode lead insulation wear off.

8. Replace the anode cap. Replace the rear enclosure.

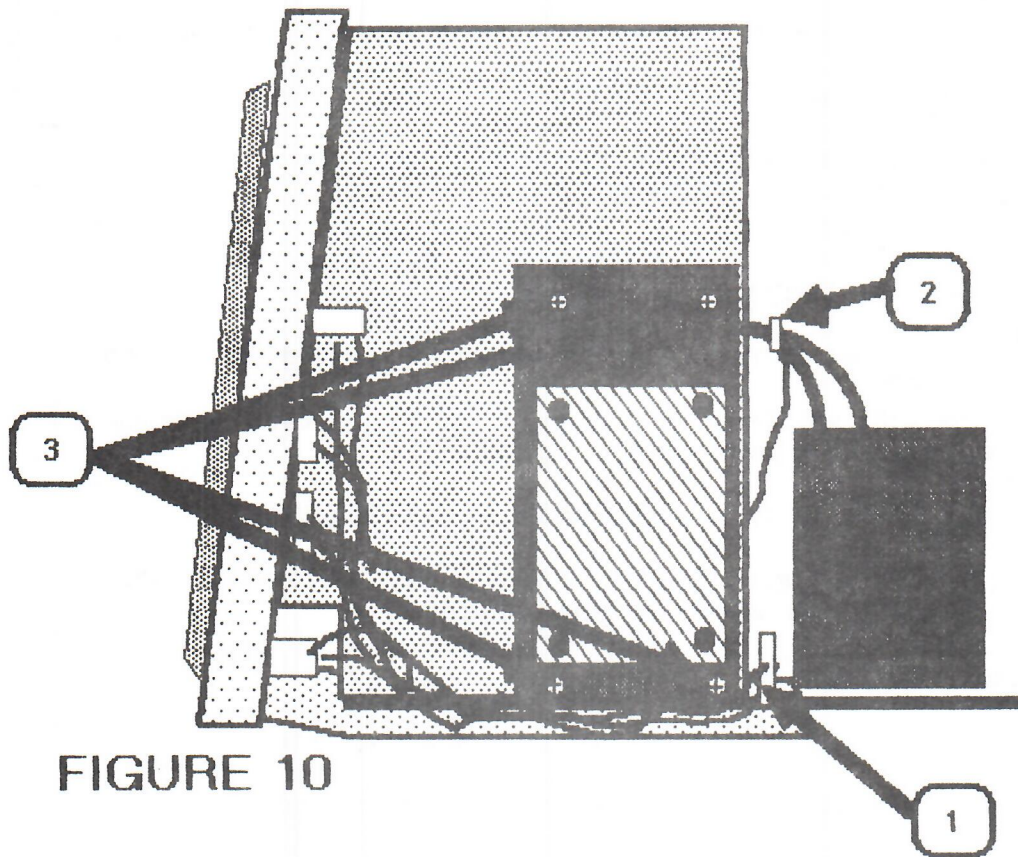


FIGURE 10

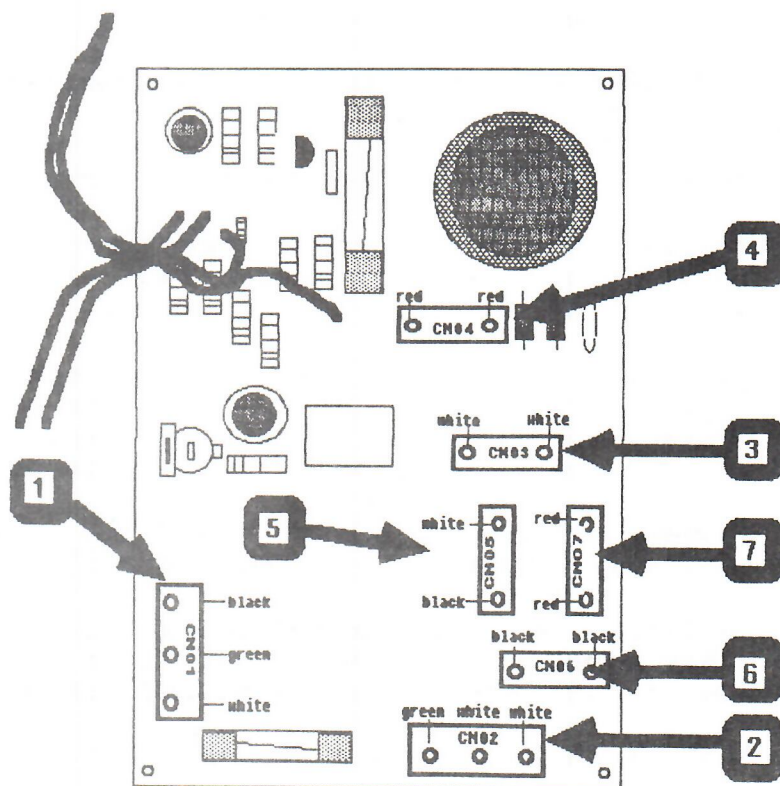


FIGURE 11



Removing the Power Supply (P/S) Board

1. Disconnect the AC power cord.
2. Remove the rear enclosure.
3. Follow steps 4 through 8 of "Discharging the CRT."
4. Disconnect CN14 from the logic board. (Figure 9, #4.)
5. Release the wires from the plastic cable clamp. (Figure 10, #1.)
6. Use a pair of diagonal cutters to cut the cable tie (Figure 10, #2) that holds the power supply wires together.
7. Remove the four Phillips screws from the P/S mounting plate (Figure 10, #3).
8. Tilt the plate slightly forward so that you can see where the connectors are on the component side (inside) of the P/S board (Figure 11).

NOTE: The connectors are labeled on the solder side of the P/S board.

9. Disconnect the following connectors from the P/S board:

CAUTION: Do not pull on the wires attached to the connectors when removing them. If any connectors are too hard to remove by hand, pry at the bottom of the connectors with a small screwdriver to loosen them before removing them. **BUT BE CAREFUL: JIGGLING THE CONNECTORS TOO HARD WHEN REMOVING THEM MAY BREAK THE TRACES NEAR THE CONNECTOR POLES ON THE SOLDER SIDE OF THE BOARD.**

- a) CN01 (black, green, and white) -- Figure 11, #1)
 - b) CN02 (green, white, and white) -- Figure 11, #2)
 - c) CN03 (white and white) -- Figure 11, #3)
 - d) CN04 (red and red) -- Figure 11, #4)
 - e) CN07 (red and red) -- Figure 11, #7)
 - f) CN05 (white and black) -- Figure 11, #5)
 - g) CN06 (black and black) -- Figure 11, #6)
10. Carefully remove the P/S board mounting plate.

Replacing the Power Supply (P/S) Board

NOTE: If you are installing a new power supply board, loosen the screw that mounts the white, rectangular heat sink resistor to the inside of the metal plate (see Diagram A, below). Position the resistor as shown in Diagram B, below and tighten the screw. The power supply board is now ready to be installed.



DIAGRAM A

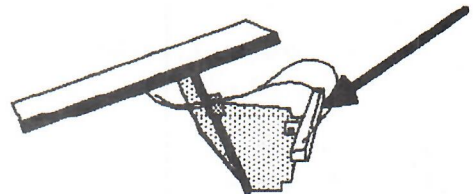


DIAGRAM B

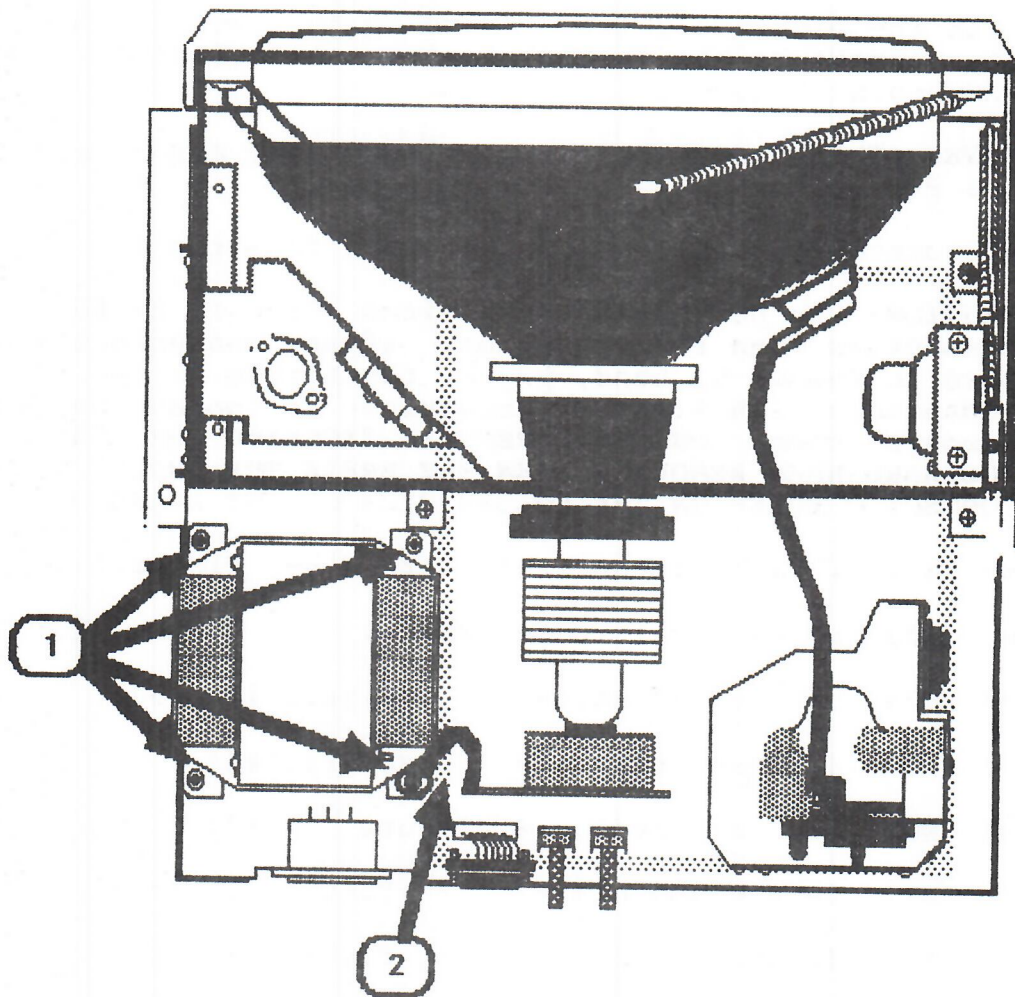


FIGURE 12



Replacing the Power Supply (P/S) Board (cont.)

1. Connect CN01 through CN07. **MAKE SURE THAT WIRE COLORS MATCH THE COLORS LISTED NEXT TO THE CONNECTORS AS SHOWN IN FIGURE 11** (see Figure 11, #1 - #7).
2. Connect CN14 to the logic board.
3. Replace the four P/S board mounting plate screws.
4. Set the wires back in the cable clamp from which they were removed (Figure 10, #1).
5. Replace the rear enclosure.

Removing the Power Transformer

1. Disconnect the AC power cord.
2. Remove the rear enclosure.
3. Follow steps 4 through 8 of "Discharging the CRT."
4. Remove the four power transformer mounting screws shown in Figure 12, #1.
5. Move the power transformer over so that you can easily reach the component side of the P/S board.
6. Disconnect CN04 and CN05 (Figure 11) from the component side of the power supply board.
7. Remove the power transformer.

Replacing the Power Transformer

1. Connect the CN04 and CN05 to the power supply board.
2. Place the transformer over its mounting holes with the wires closest to the P/S board. (Figure 12, #1.)
3. Position the ground strap over the proper screw hole (Figure 12, #2) and secure the ground strap by tightening the screw over the strap.
4. Replace the other three screws to secure the power transformer to the monitor chassis.
5. Replace the rear enclosure.

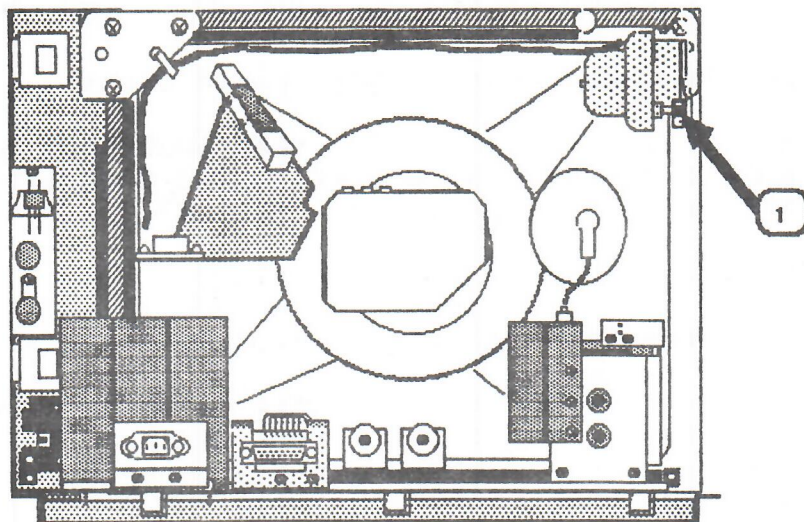


FIGURE 13

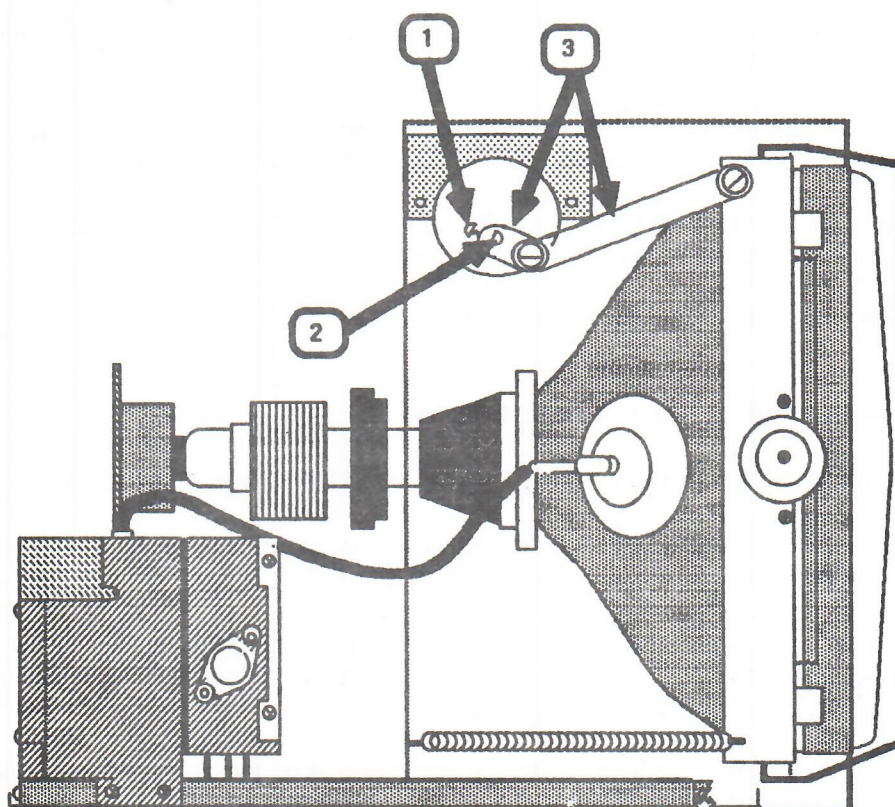


FIGURE 14



Removing the Tilt Motor

1. Remove the AC power cord.
2. Remove the rear enclosure.
3. Follow steps 4 through 8 of "Discharging the CRT."
4. Loosen the motor shaft screw (Figures 13, #1 and 14, #1) until the screw clears the shaft (Figure 14, #2).
5. Follow the two leads from the tilt motor to the power supply board. Cut any cable ties confining the motor wires. These wires are connected to the power supply board by connector 06 (CN06).
6. Disconnect CN06 from the power supply board.

NOTE: If CN06 is too difficult to remove, follow steps 4 through 8 of "Removing the Power Supply Board." Then perform step 6, above.
7. Use a Phillips stubby screwdriver to remove the two motor bracket screws located on either side of the motor.
8. Slide the motor away from the motor bracket until the shaft clears the motor link assembly (Figure 14, #3).
9. Set the motor aside.

Replacing the Tilt Motor

1. Slide the motor shaft into its fit-through in the motor link assembly (Figure 14, #2).
2. Line up the screw holes on either side of the motor with the motor bracket holes and replace the two Phillips screws.
3. Connect CN06 on the power supply board. Replace the power supply board if you had to remove it to disconnect CN06.
4. Replace the rear enclosure.

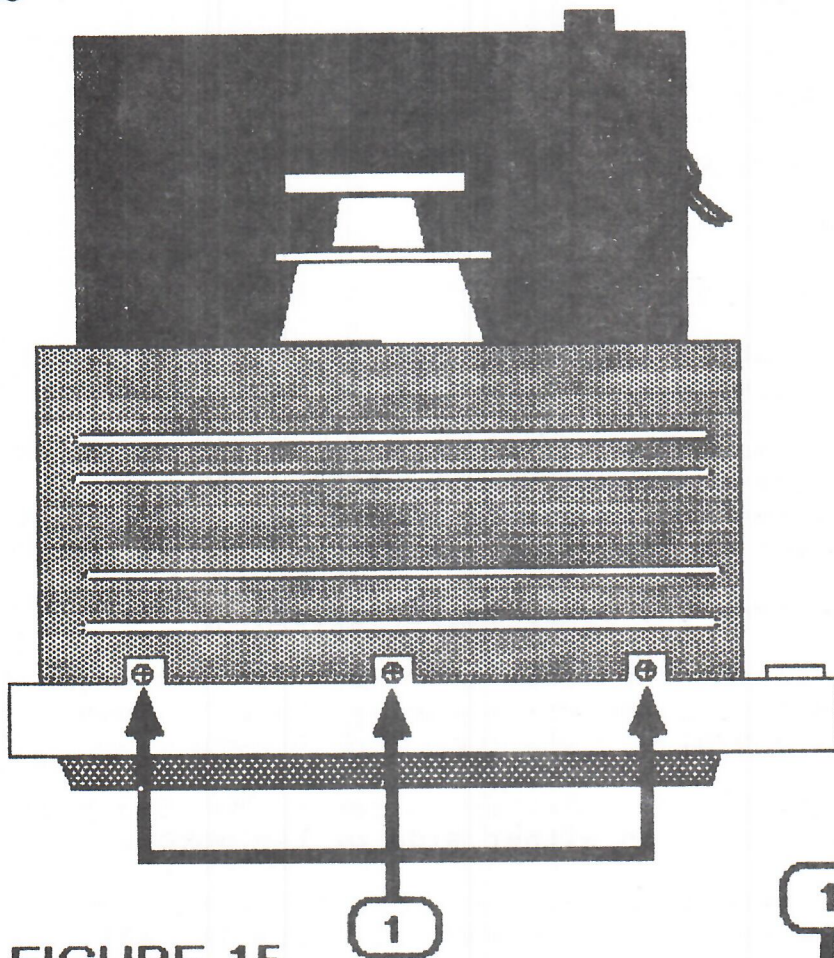


FIGURE 15

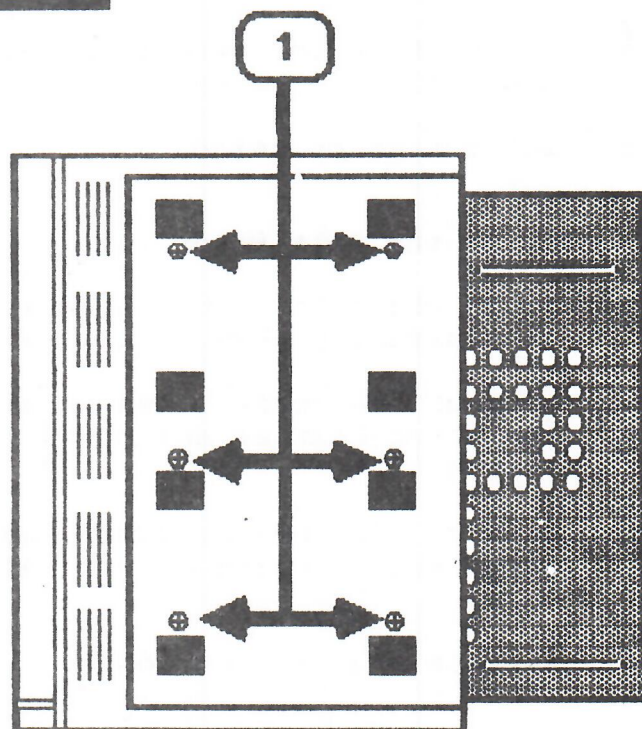


FIGURE 16



Removing the Front Bezel

1. Disconnect the AC power cord.
2. Remove the brightness/contrast control knobs.
3. Remove the rear enclosure.
4. Follow steps 4 through 8 of "Discharging the CRT."
5. Remove the brightness/contrast controls.
6. Remove the power button/switch.
7. Set the monitor on its feet. Figure 15 shows a top view of the monitor. Remove the three screws shown in Figure 15, #1.
8. Carefully place the monitor on its left side and remove the six screws shown in Figure 16, #1.
9. Place the monitor back on its feet.
10. Brace the front panel with one hand. Grasp the metal chassis by the top and lift it slightly off the table while you pull the front panel forward and away from the chassis.

Replacing the Front Bezel

1. Slide the front bezel back onto the metal chassis and replace the three screws at the top.
2. Mount the metal plate (brightness/contrast controls) back onto the front bezel.
3. Mount the plastic plate (On/Off - tilt) back onto the front bezel.
4. Place the monitor on its left side and replace the six mounting screws.
5. Replace the rear enclosure.

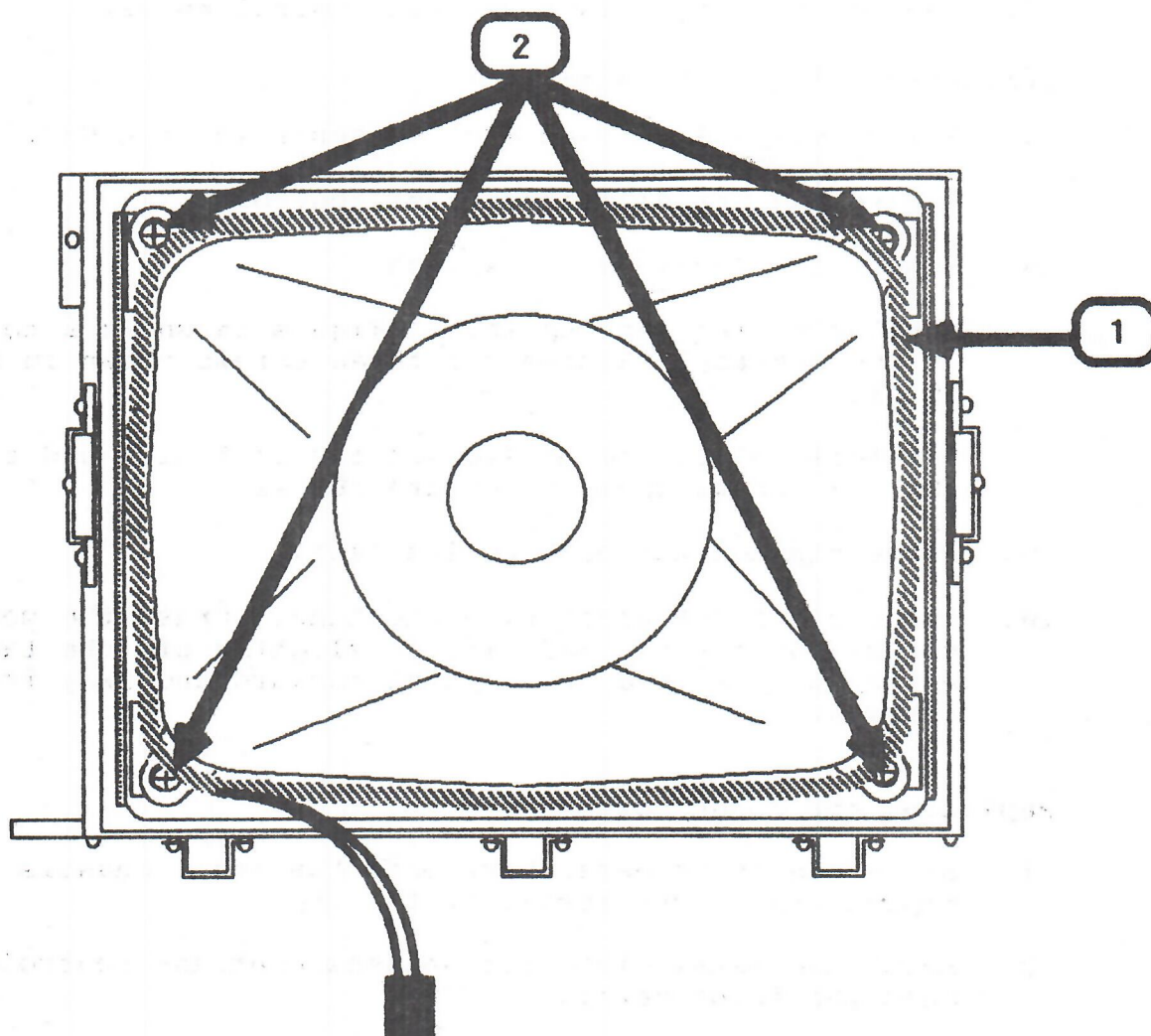


FIGURE 17



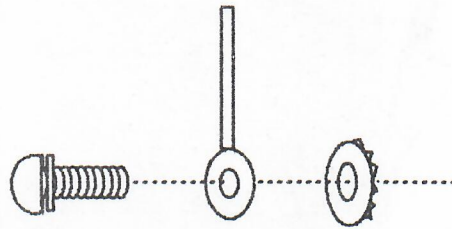
Removing the CRT/Yoke Assembly

1. Disconnect the AC power cord.
2. Remove the rear enclosure.
3. Discharge the CRT.
4. Remove the logic board.
5. Remove the power transformer.
6. Remove the power supply board.
7. Remove the tilt motor.
8. Remove the tilt loading spring.
9. Place the monitor face down on a foam pad.
10. Locate the degaussing coil (Figure 17, #1). It is braced to the CRT by plastic coated holding tabs at each corner.
11. Use a pair of needlenose pliers to bend the tabs out to free the degaussing coil.
12. Carefully lift off the degaussing coil and set it aside.
13. Use a long, Phillips screwdriver or a 5/16 nut driver to remove the four CRT mounting screws (Figure 17, #2) and holding tabs. Remove the large washers.
14. Support the CRT with one hand while you set the monitor chassis back on its feet and slide the CRT out of the chassis.

WARNING: IF YOU INTEND TO DISPOSE OF THE CRT, REFER TO "CRT DISPOSAL" IN SECTION 1.

Replacing the CRT/Yoke Assembly

1. Place the monitor face down on a foam pad.
2. Carefully set the CRT back inside the chassis with the wires facing the bottom.
3. Place the holding tabs on the CRT mounting screws. Place the large washer under the holding tabs. (Diagram below.)



4. Hold the holding tabs in place as you tighten the CRT mounting screws.
5. Orient the degaussing coil so that the connector is at the bottom and place the degaussing coil around the CRT, as close to the front as possible.
6. Bend the holding tab stems around the corners of the degaussing coil to secure the coil to the CRT.
7. Replace the tilt loading spring.
8. Replace the power supply board.
9. Replace the tilt motor.
10. Replace the logic board.
11. Replace the power transformer.
12. Replace the rear enclosure.

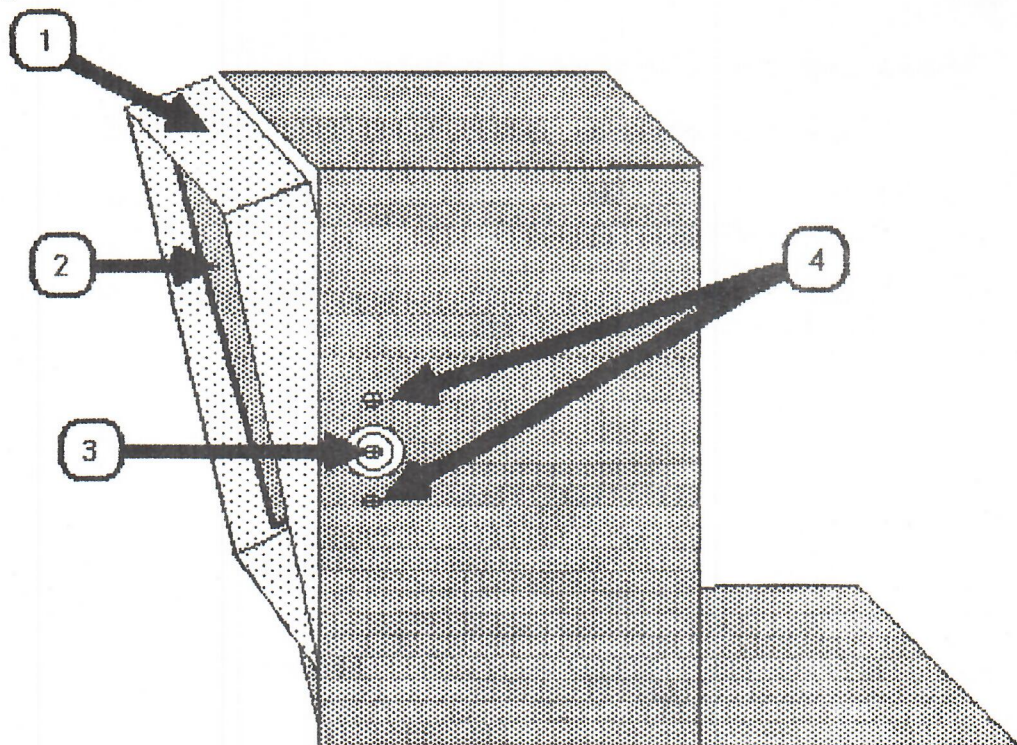


FIGURE 18

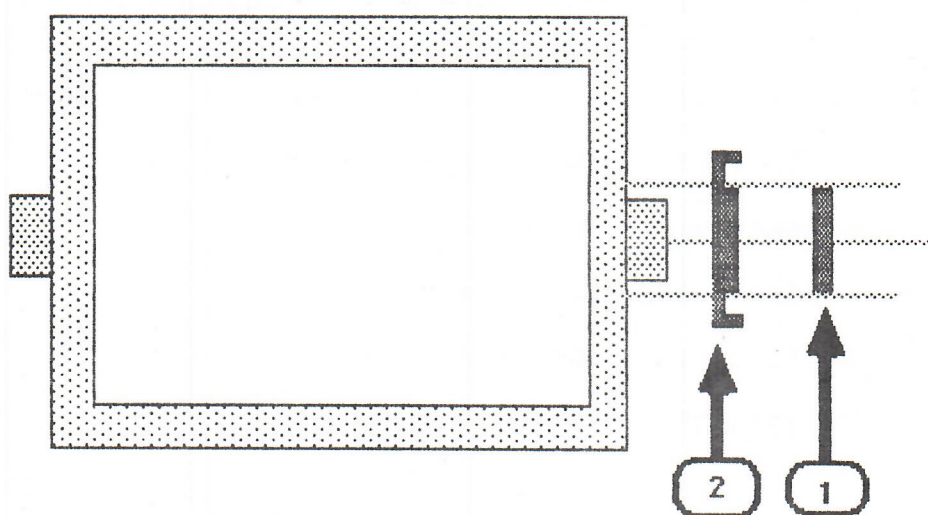


FIGURE 19



Removing the Mask

1. Disconnect the AC power cord.
2. Remove the rear enclosure.
3. Discharge and remove the CRT.

NOTE: The mask is shown in Figure 18, #1. The metal parts that come off when removing the mask are not considered part of the mask.

4. Follow the instructions below for one side of the mask, and then the other.
 - a) Support the CRT bracket (Figure 18, #2) while you loosen the axle screw (Figure 18, #3) until it clears the bracket. Set the bracket aside.
 - b) Completely remove the axle screw (Figure 18, #3).
 - c) Remove the two screws shown in Figure 18, #4.
5. Pull the mask forward and out of the monitor chassis.
6. Remove the metal ring (Figure 19, #1) and bracket (Figure 19, #2) from the mask axles on both sides of the mask.

Replacing the Mask

1. Place the metal brackets (Figure 19, #2) and rings (Figure 19, #1) back onto both mask axles.
2. Hold the brackets and rings in place as you slide the mask back into the chassis.
3. Follow these instructions for both sides of the mask:
 - a) Replace the two screws shown in Figure 18, #4.
 - b) Place the CRT bracket (Figure 18, #2) inside the mask with the screw holes adjacent to the screw holes located at the upper and lower corners of the mask.
 - c) Replace the axle screw (Figure 18, #3).

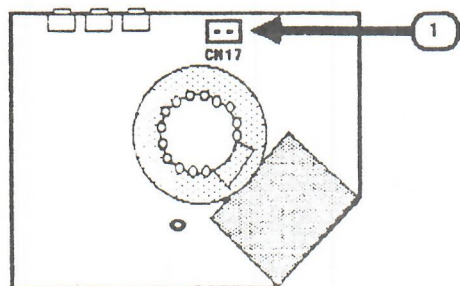


FIGURE 20

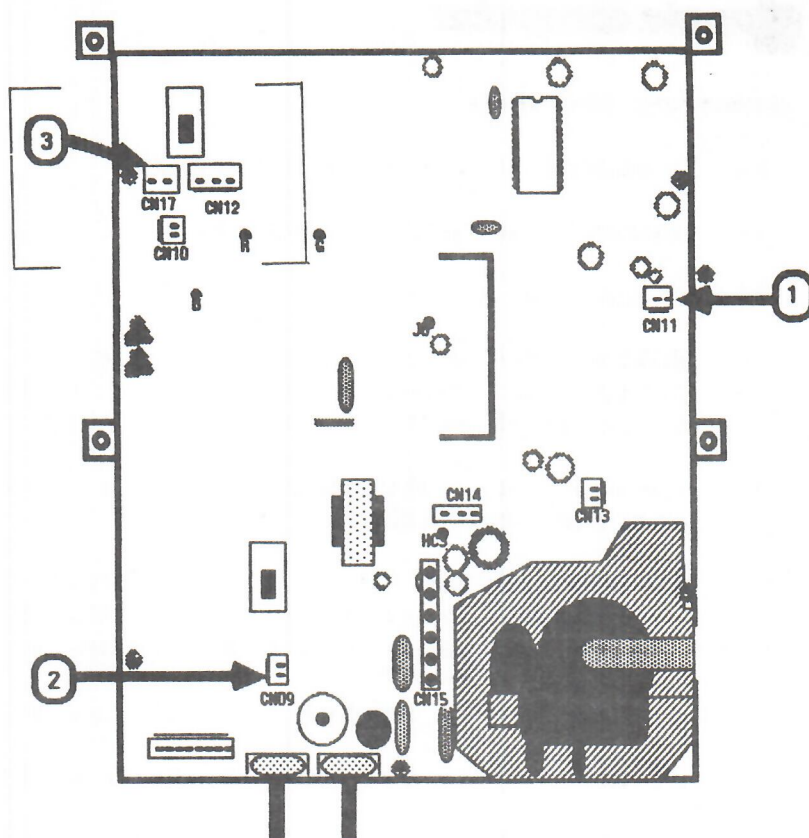


FIGURE 21

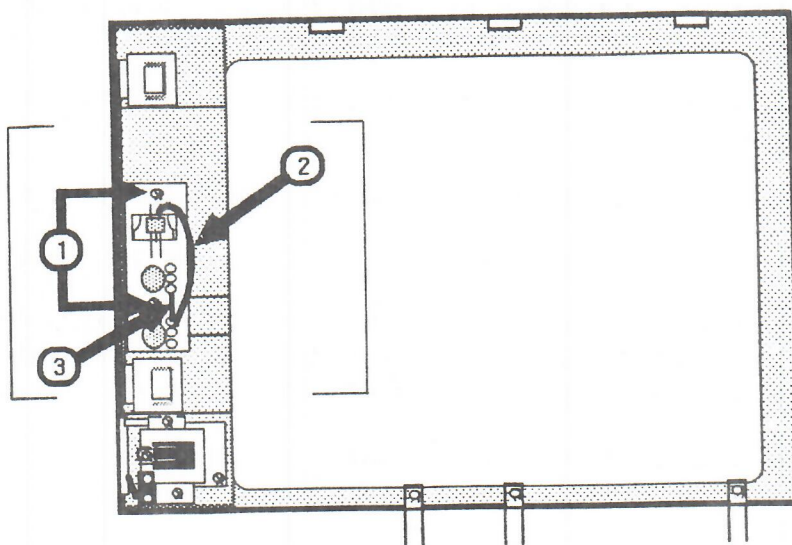


FIGURE 22



Removing and Replacing the Brightness and Contrast Control Knobs

1. Insert a flatblade screwdriver under the knob and gently pry until it is loose enough to pull off by hand.
2. To replace the knob, line up the inside of the knob with the shaft that it fits onto and slide it all the way onto the shaft.

Removing the Brightness/Contrast Control

1. Disconnect the AC cord.
2. Remove the brightness and contrast knobs.
3. Remove the rear enclosure.
4. Follow steps 4 through 8 of "Discharging the CRT."
5. As you face the back of the monitor you will see two potentiometers (brightness and contrast) and one slide switch (green only) attached to a metal plate located on the left side of the monitor. Use a pair of diagonal cutters to cut any cable ties binding the wires of those three components together.
6. Disconnect the following the connectors:
 - a) CN17 (CRT socket board) -- Figure 20, #1

NOTE: On the AppleColor Monitor 100 Rev. A, CN17 is located on the logic board (Figure 21, #3).
 - b) CN11 (logic board) -- Figure 21, #1
 - c) CN09 (logic board) -- Figure 21, #2
7. Carefully bring the wires outside of the chassis.
8. Remove the two screws (Figure 22, #1) that mount the metal plate to the front bezel and remove the plate.
9. If you are removing the brightness control from an AppleColor Monitor 100 Rev. 0, locate the wire (Figure 22, #2) that connects the brightness pot to the slide switch. Desolder and remove the wire from the brightness pot contact. If you are removing the contrast control, skip to step 11.



NOTE: The wire is not present on the AppleColor Monitor 100 Rev. A. Instead, there is a resistor connecting the brightness pot to the contrast pot (Figure 22, #3). If you are removing the brightness control, desolder the end of the resistor attached to the brightness pot. If you are removing the contrast control, desolder and remove the end of the resistor attached to the contrast pot.

- [11.] Turn the plate around and remove the mounting nut and the potentiometer.

Replacing the Brightness/Contrast Control

1. Slide the pot shaft back through its fit-through on the mounting plate.
2. Orient the pot with the contacts facing in the same direction as they are on the brightness/contrast pot and replace the mounting nut.
3. If you are replacing the brightness control, solder the wire that was previously removed to the single contact.
[(On the AppleColor Monitor 100 Rev. A, resolder the resistor wire to the pot from which it was disconnected).]
4. Mount the plate back onto the front bezel.
5. Tie the wires together with new cable ties if you have them. Also, tie the three sets of wires to the wires extending from the On/Off switch.
6. Route the wires back through the cable clamp located just in front of the power transformer.
7. Connect the following connectors:
 - a) CN17 (CRT socket board) -- Figure 20, #1
[(On the AppleColor Monitor 100 Rev. A, CN17 connects to the logic board -- Figure 21, #3).]
 - b) CN11 (logic board) -- Figure 21, #1
 - c) CN09 (logic board) -- Figure 21, #2
8. Replace the rear enclosure.
9. Replace the knobs.



Removing the Green Only Switch

1. Follow Steps 1 through 7 of "Removing the Brightness/Contrast Control."
2. If you are working on an AppleColor Monitor 100 Rev. 0, desolder and remove the wire connecting the green only switch to the brightness pot. (On the AppleColor Monitor 100 Rev. A, there is no wire on the green only switch).
3. Remove the two Phillips screws that attach the button to the metal plate. They are located at either side of the switch.

Replacing the Green Only Switch

1. Place the switch back into its fit-through on the mounting plate. The soldered contacts should be at the top.
2. Replace the two mounting screws.
3. Slide the green button back onto its shaft.
4. Solder the wire previously removed back onto outermost switch contact.
[(For AppleColor Monitor 100 Rev. A, skip this step -- there is no wire).]
5. Follow steps 4 through 9 of "Replacing the Brightness/Contrast Control."

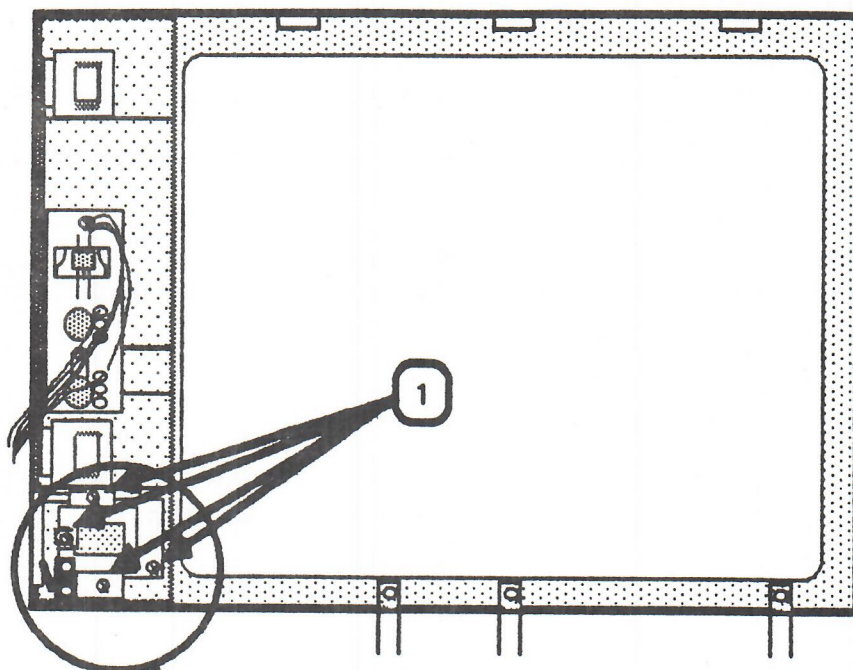


FIGURE 23

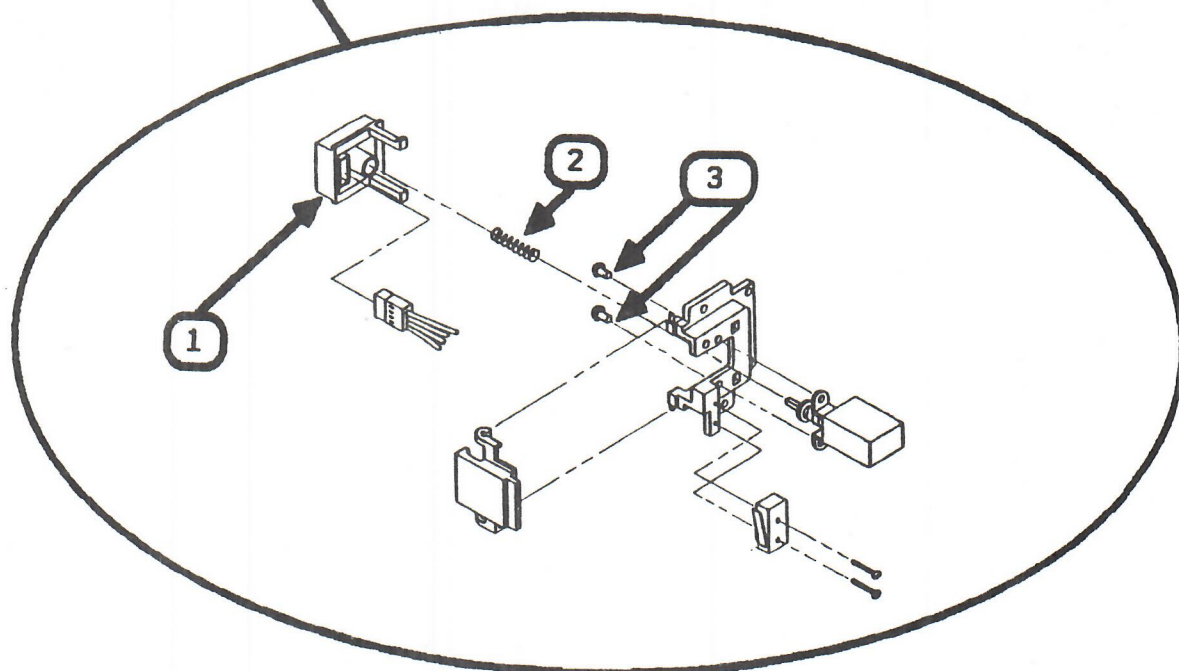


FIGURE 24



Removing the Power Button/Switch

1. Disconnect the AC power cord.
2. Remove the rear enclosure.
3. Follow steps 4 through 8 of "Discharging the CRT."
4. Locate the plastic mounting plate circled in Figure 23. Remove the four Phillips screws (Figure 23, #1).
5. The power button (Figure 24, #1) is attached to the plastic mounting plate by two legs at the top of the button. To release the button, push the two legs inward as you pull the button away from the mounting plate.

NOTE: If you are removing the power switch, go to Step 7.

6. Locate the tiny PC board on the inside of the power button. This is the LED. It is attached to the button by two small Phillips screws. Remove the screws to separate the PC board from the power button.
7. Remove the small spring (Figure 24, #2) located on the power switch shaft.
8. Remove two Phillips switch mounting screws (Figure 24, #3) located at either side of the power switch shaft.
9. Follow the power switch wires back to their connector (CN02) on the component side of the power supply board. Disconnect CN02 and completely remove the switch.

NOTE: If CN02 is too difficult to remove, follow steps 6 and 7 of "Removing the Power Supply Board" for easier access to the connector.

Replacing the Power Button/Switch

1. Orient the plastic mounting plate as it is shown in Figure 24.
2. Insert the switch into the plastic mounting plate with the wires on the right.
3. Place the spring back on the shaft of the switch (Figure 24, #2.) and replace the switch mounting screws.

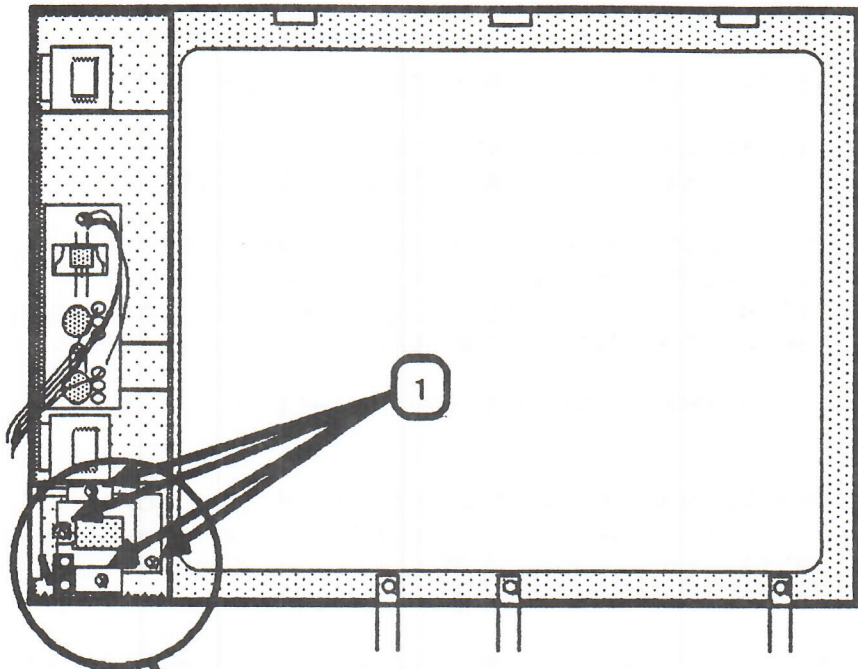


FIGURE 25

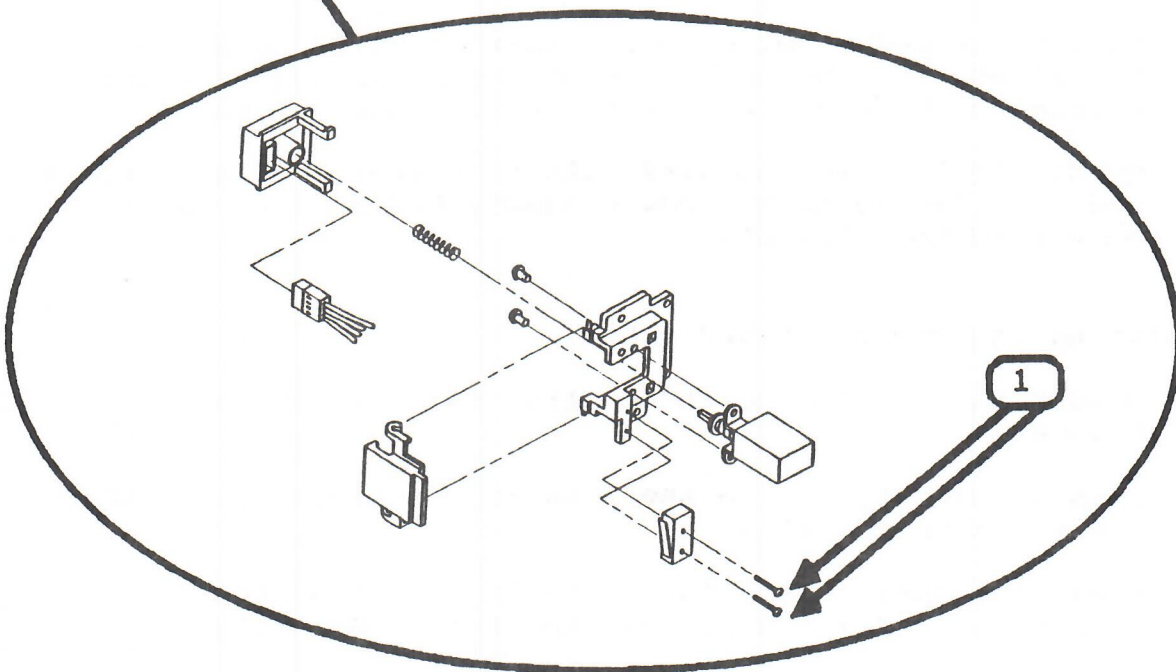


FIGURE 26

4. Hold the spring in place while you insert the power button legs back through the fit-throughs in the plastic plate. The spring fits into the hole in the back of the switch.

Removing the Tilt Motor Button/Switch

1. Disconnect the AC power cord.
2. Remove the rear enclosure.
3. Follow steps 4 through 8 of "Discharging the CRT."
4. Locate the plastic mounting plate circled in Figure 25. Remove the four mounting screws (Figure 25, #1).
5. Remove the two screws (Figure 26, #1) that secure the switch to the plastic plate.
6. Follow the tilt switch wires to where they connect to the power supply board by connector CN07. Disconnect CN07 from the power supply board.

NOTE: If CN07 is too difficult to remove, follow steps 6 and 7 of "Removing the Power Supply Board" for easier access to CN07. Then continue with the next step.

7. Pull the tilt button back and away from the plastic plate until it snaps off.

Replacing the Tilt Motor Button/Switch

1. Snap the tilt button back on to its hinges.
2. Replace the two mounting screws that secure the switch to the plastic plate.
3. Connect the switch connector (CN07) to the power supply board.
4. Replace the four mounting screws to secure the plastic plate to the front bezel.

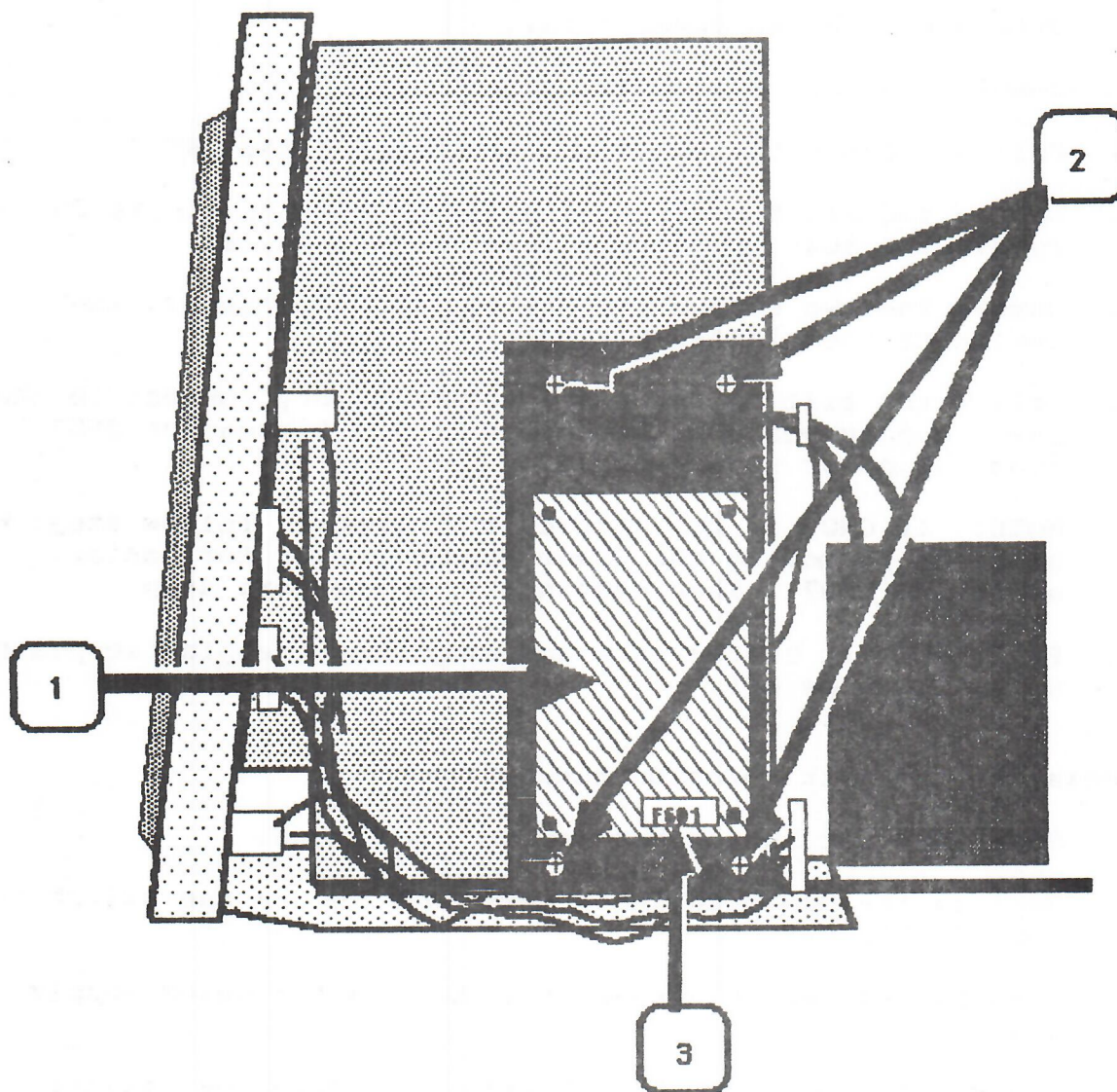


FIGURE 27



Replacing the Power Supply Fuse (F601)

The power supply fuse (F601) is mounted on the component side (inside) of the power supply board (Figure 27, #1). You do not have to remove the board completely in order to replace the fuse. The following procedures tell how to replace the power supply fuse (F601).

NOTE: Fuse F601 should be replaced with a 250V 2A Slow Blow fuse whenever you service a color monitor with a serial number below 025769.

1. Disconnect the AC power cord.
2. Remove the rear enclosure.
3. Follow steps 4 through 8 of "Discharging the CRT."
4. Remove the four screws (Figure 27, #2) from the power supply mounting plate.
5. Pull the bottom of the mounting plate up and over the wires leading to the control panel to gain access to the fuse.

Figure 27, #3 shows the location of the fuse (F601) from the solder side (outside) of the power supply board.

6. Pry the fuse out of the fuse holder (away from the board).

CAUTION: DO NOT TRY TO SLIDE THE FUSE SIDEWAYS. YOU MAY BREAK THE FUSE HOLDER.

7. Snap in the 250V 2A Slow Blow Fuse.
8. Reposition the power supply mounting plate flush against the chassis.
9. Replace the four mounting screws.
10. Replace the rear enclosure.



AppleColor Monitor 100 Technical Procedures

Section 3

Adjustments

Logic Board Adjustments.....	3.3
Introduction.....	3.3
Materials Needed.....	3.3
Set Up Procedure.....	3.5
Evaluating the Video Test.....	3.7
Vertical Adjustments.....	3.9
Horizontal Adjustments.....	3.9
Focus Adjustment.....	3.9
Color Adjustments.....	3.11
Color Bar Check.....	3.11
White Balance.....	3.11

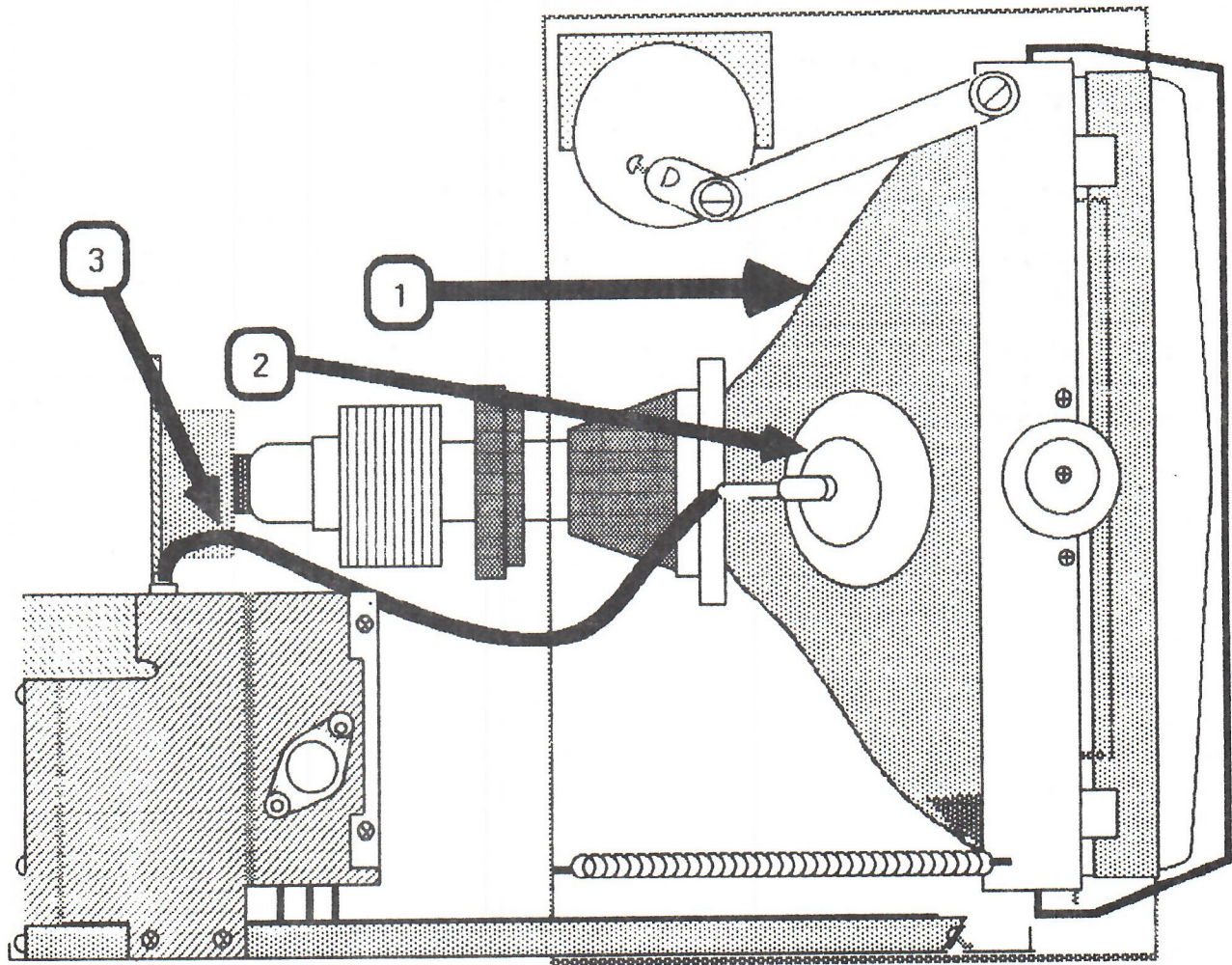


FIGURE 1



LOGIC BOARD ADJUSTMENTS

Introduction

After replacement of the logic board in the AppleColor Monitor 100 the vertical height and/or the vertical hold may need adjustment. It is important that you read all the steps completely before beginning the adjustments, as several of them interact with each other; so if it looks like a step is not working, it's possible that another step will correct the problem.

All yoke assembly adjustments have been preset by the manufacturer. Do not attempt to make any tilt, ring, or geometric adjustments on the AppleColor Monitor 100.

Materials Needed:

Working AppleColor Monitor 100
Apple][or //e
Extended 80-Column Text AppleColor Card (P/N 699-0221)
Apple //e Diagnostic ROM Card (P/N 661-94086)
Plastic hex tip iron core adjustment tool (size 0.00)
Small plastic flatblade screwdriver (tweaker)

WARNING: There are extremely high voltages on the tube, the anode, and the anode lead. In these adjustments you will be putting your hand near these high voltage parts. It is **IMPERATIVE** that you watch what you are touching while making any adjustments when the power is on, otherwise injury can result. Avoid touching the tube, anode, and the anode lead (Figure 1, #1, #2, and #3). Use only one hand to make all adjustments! Never hold on to the chassis with your free hand while making adjustments.

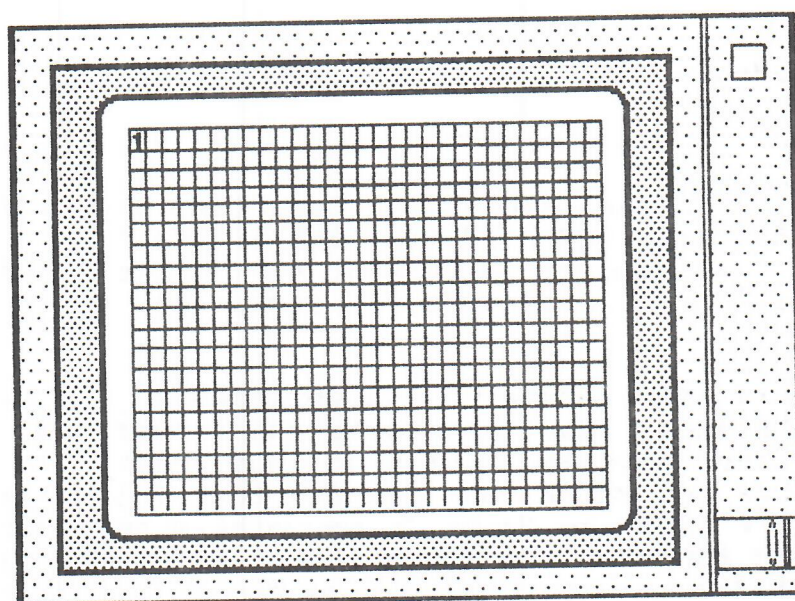


FIGURE 2



Set Up Procedure

WARNING: MAKE SURE THE POWER IS OFF ON THE MONITOR AND ON THE APPLE //e

1. Remove the rear enclosure (Take-Apart).
2. Connect the AppleColor Monitor 100 to the Apple //e. If you do not know how to do this, refer to the Extended 80-Column Text Card manual.
3. Insert the Apple //e ROM card into slot 1 or 2 and make sure that the switch on top of the ROM card is pointing toward the rear of the computer. If you do not know how to do this, refer to the Diagnostics Section of the Apple //e Technical Procedures.
4. Turn on the monitor and the Apple //e. If the menu does not appear when the power is turned on, the switch on the ROM card is in the wrong position. Shut off the system, change the switch position, and turn the system back on.
5. Select the Video Tests (V) from the menu, then press the spacebar. You will now see a high resolution pattern on the screen. Numbers 1 and 2 should be alternating in the upper left-hand corner of the screen. (Figure 2.)
6. View the screen and evaluate the vertical alignment and horizontal alignment (see the next page for evaluation procedures). Determine which one needs correction and proceed to the correct adjustment. There is interaction between the two adjustments, so you might have to do both to correct any problems.



Evaluating the Video Test (Grid Pattern)

When evaluating the pattern do not use the grid boxes in the corners as examples: use the middle rows. If the corners look incorrect even after adjustments have been made, then there may be a yoke alignment problem and you should return the monitor to Apple. If the grid boxes are not all the same size there may be a linearity problem. There are no linearity adjustments; therefore, if a linearity problem still exists after all other adjustments have been made, return the monitor to Apple. Other guidelines to follow for evaluating the vertical and horizontal alignments are as follows:

1. Refer to "Vertical Adjustments" if:
 - a) the grid boxes in the top and bottom rows do not have the same height.
 - b) the grid boxes are stretched out or compressed vertically.
 - c) the picture is rolling.
 - d) the image is pushed more to the top or bottom.
2. Refer to "Horizontal Adjustments" if:
 - a) the width of the grid boxes on both sides of the screen is not the same.
 - b) the grid boxes are stretched out or compressed horizontally.
 - c) the picture is tearing (appears ripped).
 - d) the picture is pushed more to one side of the screen than the other.
 - e) the picture is rolling in a diagonal movement on the horizontal plane.

NOTE: There are two ways you can view the patterns and make adjustments. One is to view the screen and reach around to the back to do the adjusting. The second way is to set up a mirror in front of the screen and view it from the rear while making the adjustments.

WARNING: IF YOU USE THE REACHING METHOD, BE SURE YOU KNOW WHAT YOU ARE TOUCHING!

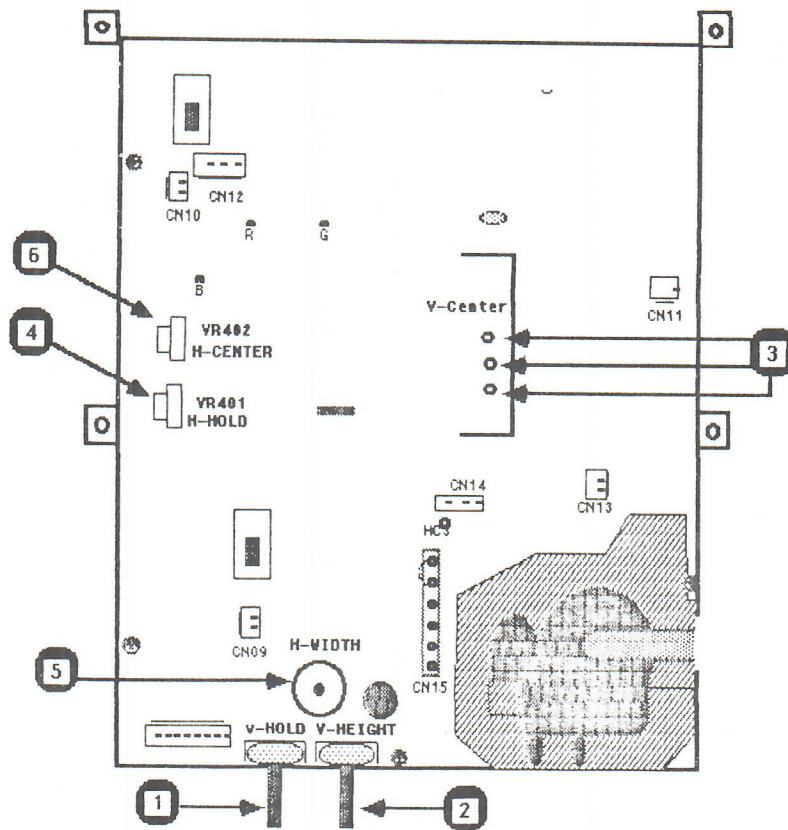


FIGURE 3

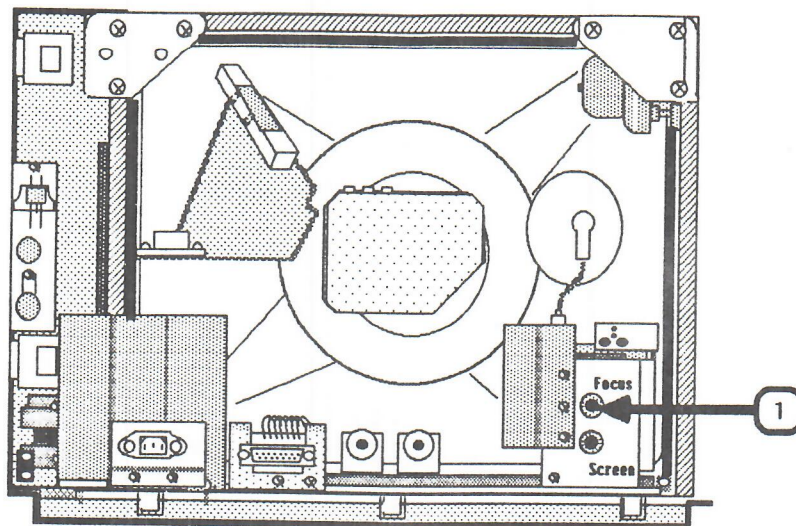


FIGURE 4



Vertical Adjustments

1. Vertical Hold: Set the vertical hold control VR301 (Figure 3, #1) to the mechanical center by turning it all the way to the left, then to the right, then back to the center of the range between left and right of its rotation. This should lock the picture on the screen and prevent any rolling.

Turn the monitor off and back on, to make sure the vertical hold is secure.

2. Vertical Height: If the vertical height of the image is incorrect, then adjust V-HEIGHT VR302 (Figure 3, #2) until the picture is about 1/4 inch away from the top and bottom edges of the screen.
3. Vertical Center: If the vertical position of the entire image is off, carefully connect the H-C4 connector (Figure 3, #3) to the best position pin to correct this problem. [On the AppleColor Monitor 100 Rev. A, the three pins are not as perfectly aligned as those shown in Figure 3, #3).] BE CAREFUL, IT IS CLOSE TO THE CRT NECK!

Horizontal Adjustments

1. Horizontal Hold: If the picture on the tube is not locked and is tearing, adjust H-HOLD R402 (Figure 3, #4).
2. Horizontal Width: The image should be about 1/4 inch away from each side of the screen. If the width of the image looks too narrow or too wide, adjust the H-WIDTH L406 (Figure 3, #5) until you have the desired width.
3. Horizontal Center: If the image is too far to one side of the screen, adjust H-CENTER VR402 (Figure 3, #6) until the image is centered.

Focus Adjustment

If the picture on the screen is blurry adjust the FOCUS pot, which is located at the back of the flyback transformer. (Figure 4, #1.)

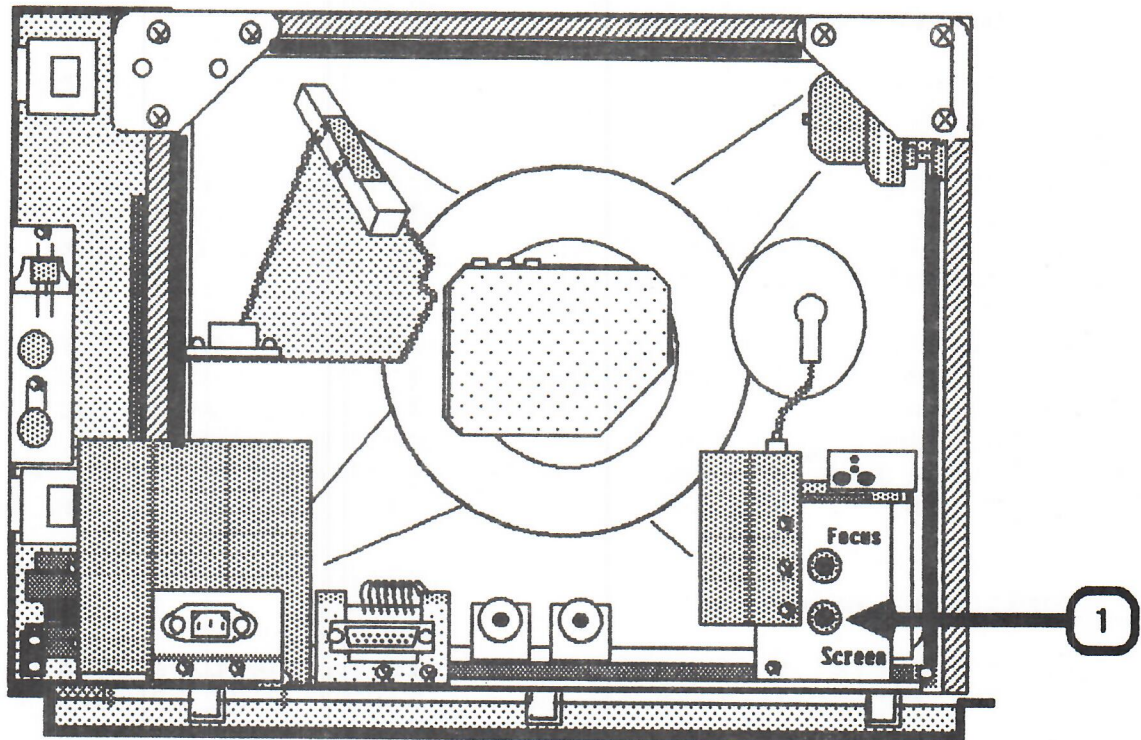


FIGURE 5



Color Adjustments

Color Bar Check

1. Insert the Extended 80-Column Text/AppleColor Card into the auxiliary slot of the Apple //e. If you do not know how to do this, refer to the user's manual for the card.
2. Locate the two DIP switches on the Extended 80-Column Card and switch both levers to the lower (bottom) position.
3. Replace the Apple //e lid.
4. Insert the Extended 80-Column Text AppleColor Card "Demo Drivers Diskette" (ProDOS Based) into the disk drive.
5. Turn on the Apple //e.
6. Turn on the AppleColor Monitor 100.

7. When the menu appears, press the down arrow on the keyboard to select "DHR.COLORS", then press "RETURN".

The monitor will display 16 color bars with the name of the color beneath each bar.

8. Make sure that the colors match their names. If they do not match, follow the procedures below to adjust the color.

White Balance

Proper color adjustment is achieved by obtaining "white balance." The white balance is obtained by adjusting the screen potentiometer of the flyback transformer along with all the pots located on the CRT socket board. For this procedure you do not need to connect the monitor to the Apple //e.

WARNING: MAKE SURE THAT THE POWER IS OFF!

1. Remove the rear enclosure (Take-Apart).

NOTE: Do not connect the DB-15 video cable to the monitor.

2. Connect the AC power cord to the back of the monitor and to the wall outlet.
3. Turn the SCREEN pot (Figure 5, #1) counterclockwise as far as it will turn.

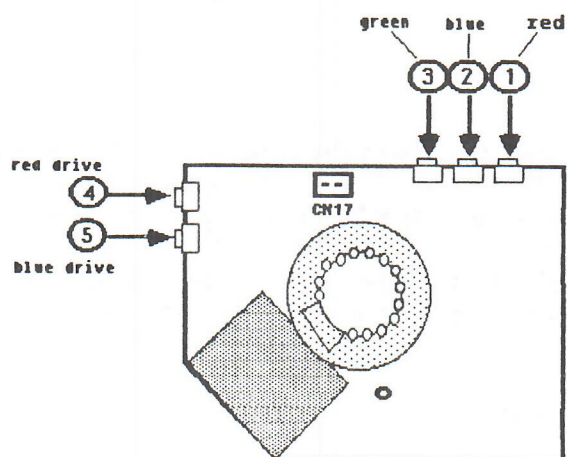


FIGURE 6

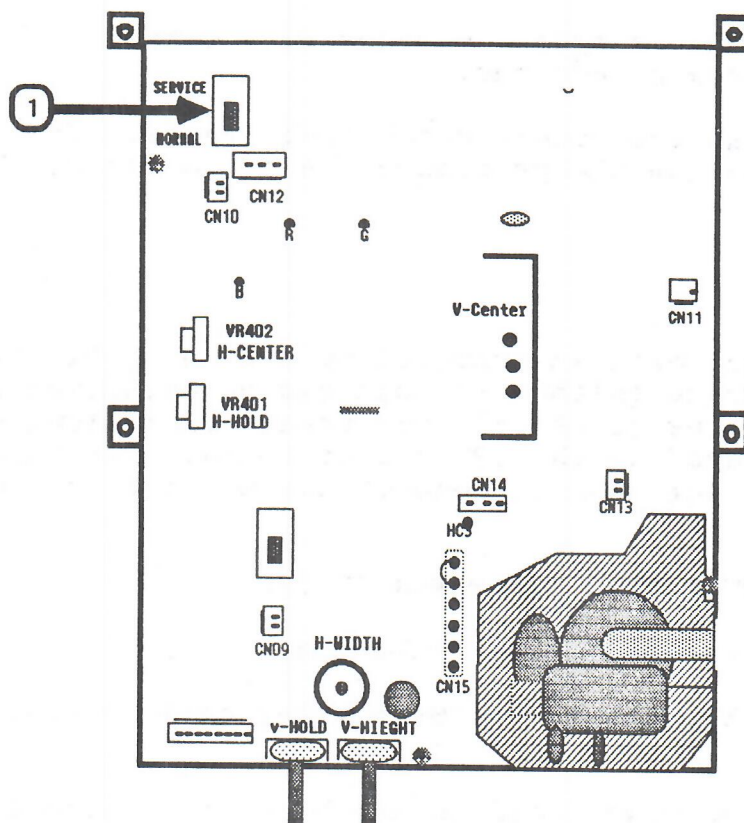


FIGURE 7



4. Adjust the following pots, located on the CRT socket board, to their mechanical centers by turning them all the way to the left, then to the right, then back to the center of the range between left and right:
 - a) VR501 (Red Bias) -- Figure 6, #1
 - b) VR502 (Green Bias) -- Figure 6, #2
 - c) VR503 (Blue Bias) -- Figure 6, #3
 - d) VR504 (Red Drive) -- Figure 6, #4
 - e) VR505 (Blue Drive) -- Figure 6, #5
5. Use the eraser end of a pencil, or another nonconductive tool, to push Switch (SW) 101 (Figure 7, #1) to the SERVICE position.
6. Turn on the monitor.
7. Observing the center of the screen, turn the SCREEN pot gradually clockwise until you see a horizontal line.

NOTE: Do not turn the SCREEN pot until the line is glowing, but just until you see a fine, solid line.

THE LINE SHOULD APPEAR WHITE. If the line is not white, repeat step 7. Watch closely to see which color appears first. Then, adjust the appropriate bias pot(s) (listed in step 4, above) until that color is defeated. If another color appears, repeat this step until the line is white.
8. Turn the SCREEN pot slightly clockwise to make sure that the line remains white. If it is not white adjust the appropriate color bias pot to obtain a white line.
9. Turn the SCREEN pot counterclockwise until the white line disappears.
10. Turn off the monitor and switch SW 101 (Figure 7, #1) back to the NORMAL position.
11. Turn the monitor back on and repeat the steps listed in the "Color Bar Check" in this manual.



AppleColor Monitor 100 Technical Procedures

Section 4

Troubleshooting Guide

Introduction.....	4.2
Symptoms:	
No raster.....	4.2
One horizontal line appears.....	4.2
One vertical line appears.....	4.2
Raster deformed abnormally.....	4.2
Abnormal raster with winding or excessive picture fluctuation.....	4.3
Spot remains with monitor off.....	4.3
Brightness range abnormal or picture is flashing.....	4.3
Raster size small picture abnormally bright.....	4.3
No vertical synchronization.....	4.3
Raster not centered.....	4.3
No picture no contrast.....	4.3
Picture/characters inclined.....	4.3
Picture characters shiver.....	4.4
15 or more seconds for picture to appear.....	4.4
Picture appears/disappears.....	4.4
Horizontal linearity bad.....	4.4
Vertical linearity bad.....	4.4
Won't focus.....	4.4
Colors not right.....	4.4



Introduction

This is the troubleshooting section. It consists of a symptom chart, showing the symptom and an action to be taken to rectify the problem. The best way to use this section is:

1. Look on the chart to find the symptom that matches what the defective monitor is doing.
2. Try the recommended action.

SYMPTOM

ACTION

NO RASTER

[Replace fuse 601 on the P/S board with
a **250V 2A Slow Blow Fuse**.]

Check that all connectors are secure on
the P/S and logic board.

Replace the Power Switch.

Replace the P/S board.

Replace the logic board.

Replace the power transformer.

Replace the CRT.

ONE HORIZONTAL
RASTER LINE
APPEARS

Check to make sure that SW101 on the
logic board is in the NORMAL position.

Replace the logic board.

Replace the CRT.

ONE VERTICAL
RASTER LINE
APPEARS

Replace the logic board.

Replace the CRT.

RASTER DEFORMED
ABNORMALLY

Replace the CRT.

**SYMPTOM****ACTION**

ABNORMAL RASTER
WITH WINDING OR
EXCESSIVE PICTURE
FLUCTUATION

Replace the logic board.

SPOT REMAINS
WHEN UNIT IS
OFF

Replace the logic board.

BRIGHTNESS RANGE
ABNORMAL OR
PICTURE IS
FLASHING

Replace the logic board.

Replace the P/S board.

Replace the power transformer.

RASTER SIZE SMALL
PICTURE ABNORMALLY
BRIGHT

See Section 3, "Adjustments."

Replace the logic board.

NO VERTICAL
SYNCHRONIZATION

See Section 3, "Adjustments."

Replace the logic board.

RASTER NOT
CENTERED

See Section 3, "Adjustments."

Replace the logic board.

Replace the CRT.

NO PICTURE
NO CONTRAST

Replace the logic board.

PICTURE /
CHARACTERS
INCLINED

See Section 3, "Adjustments."



SYMPTOM	ACTION
FINE NOISES IN PICTURE. CHARACTERS SHIVER.	Make sure the ground strap is secured to the power transformer. Replace the logic board.
FIFTEEN OR MORE SECONDS FOR PICTURE TO APPEAR	Replace the CRT.
PICTURE APPEARS DISAPPEARS	Replace the logic board. Replace the CRT.
HORIZONTAL LINEARITY BAD	Replace the logic board. Replace the CRT.
VERTICAL LINEARITY BAD	Replace the logic board. Replace the CRT.
WON'T FOCUS	Replace the logic board. Replace the CRT.
COLORS NOT RIGHT	See Section 3, "Adjustments."



AppleColor Monitor 100 Technical Procedures

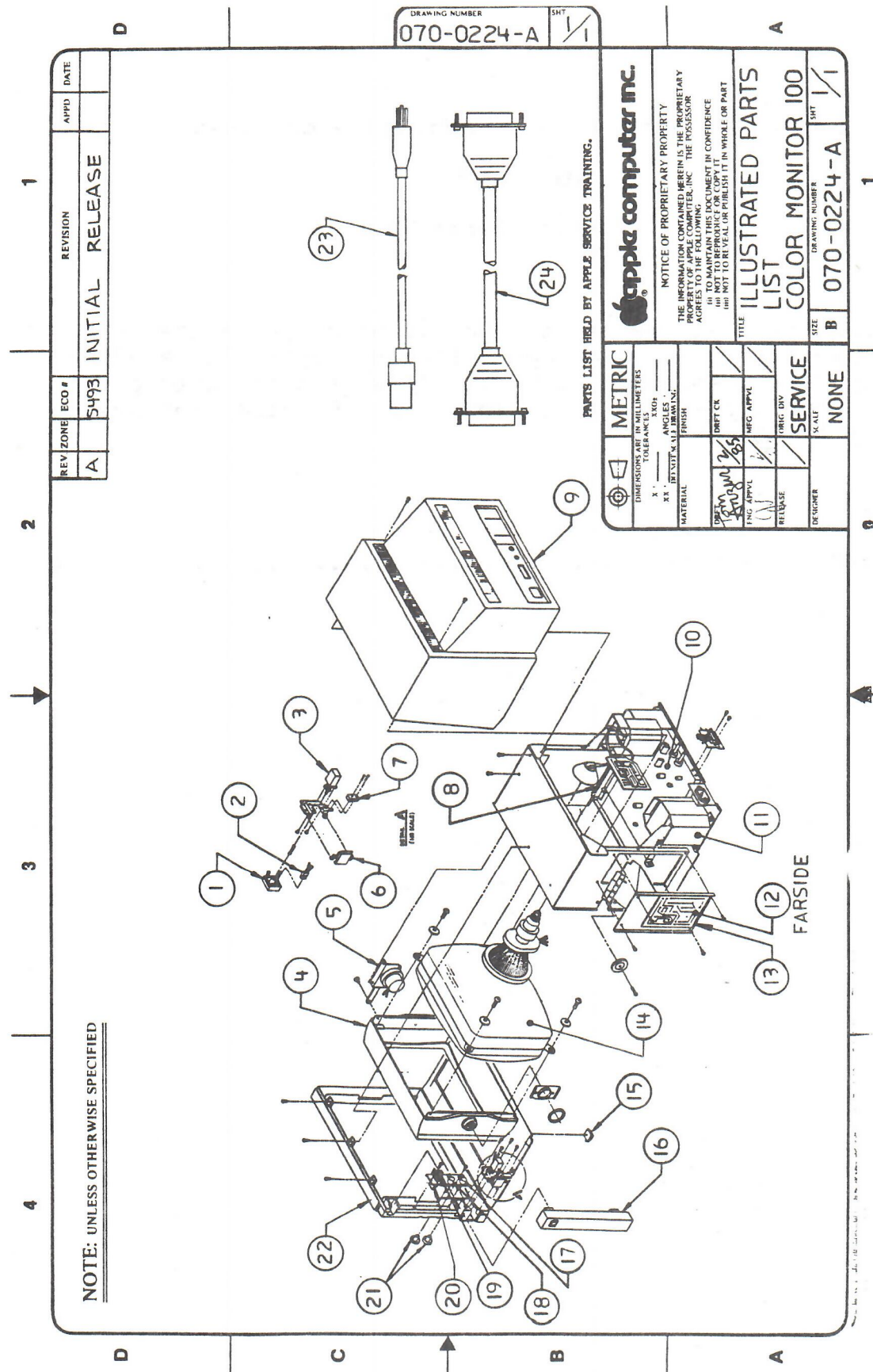
Section 5

Illustrated Parts List

The figures and lists below include all piece parts that can be purchased separately from Apple for the AppleColor Monitor 100, along with their part numbers. These are the only parts available from Apple. Refer to your Apple Service Programs manual for prices.

Contents:

Illustrated Parts List.....	5.1
-----------------------------	-----





AppleColor Monitor 100

Item	Part No.	Description
1	815-0543	Power Switch Bottom
2	970-1000	LED Assembly
3	970-0995	Power Switch
4	815-0549	Mask
5	970-0997	Tilt Motor
6	815-0544	Button, Tilt Switch
7	970-0996	Tilt Motor Switch
8	970-0998	Tilt Loading Spring
9	815-0546	Rear Enclosure
10	661-0238	Logic Board, Rev. O
	661-0292	Logic Board, Rev. A
11	076-8119	Power Transformer
12	740-0204	Fuse, 2A UL, CSA
13	661-0237	Power Supply Board
14	076-8120	CRT/Yoke Assembly
15	865-0020	Rubber Foot
16	815-0545	Control Panel Door
17	970-0990	Brightness Control
18	970-0991	Contrast Control
19	970-0994	Green Only Switch
20	815-0550	Green Only Button
21	815-0547	Contrast/Brightness Control Knob
22	815-0542	Front Bezel
23	970-0876	Cable, AC Power Cord, AppleColor Monitor 100
24	590-0194	Cable, Video, AppleColor Monitor 100

